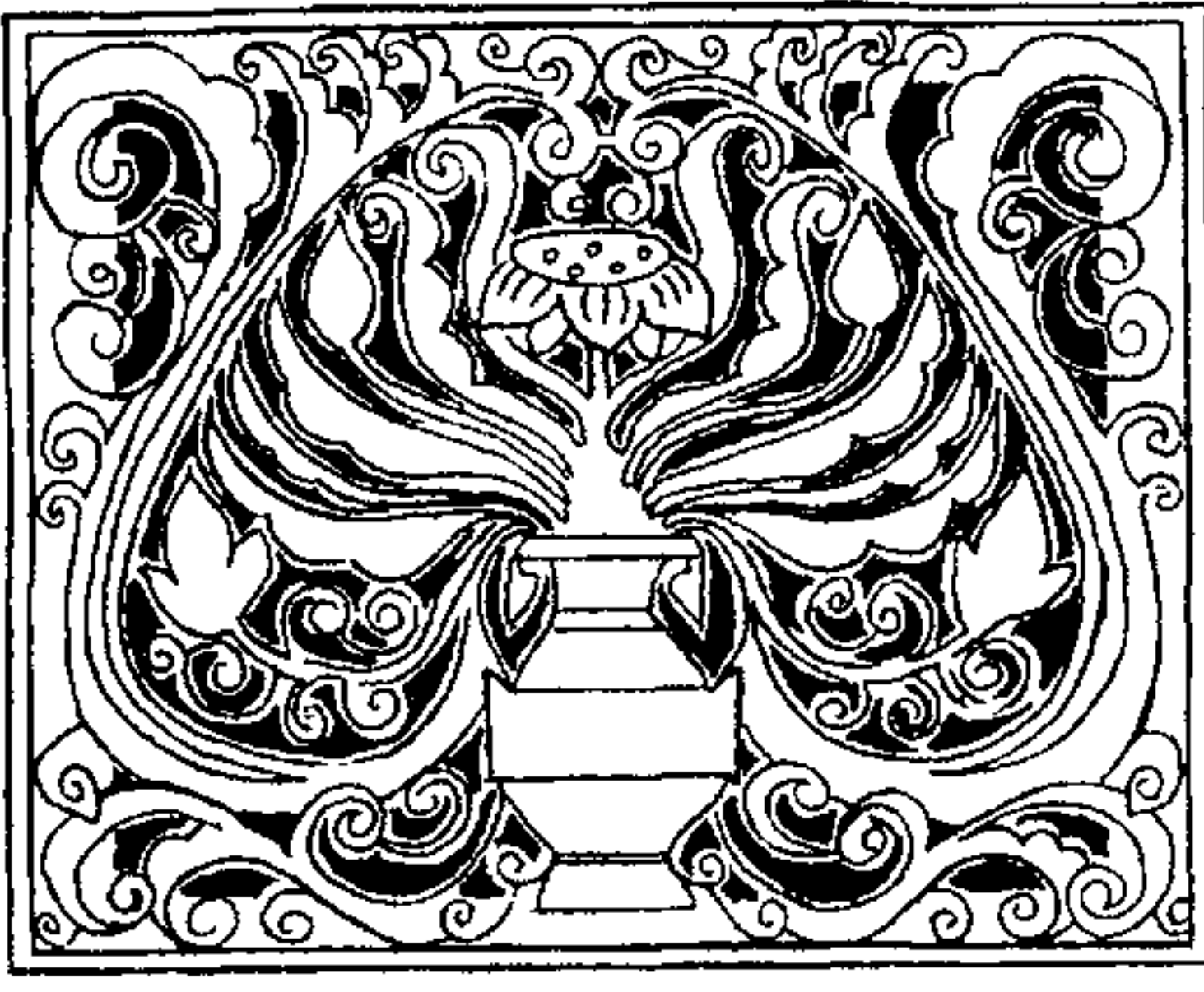




PRABUDDHA BHARATA

*A Monthly Journal of Ramakrishna Order
started by Swami Vivekananda in 1896*

MAY 2000

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— Swami Vivekananda

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PRABUDDHA BHARATA

ARISE! AWAKE! AND STOP NOT TILL THE GOAL IS REACHED

Vol. 105

MAY 2000

No. 5

VEDIC PRAYERS

उषा उच्छन्ती समिधाने अग्ना
उद्यन्तसूर्य उर्विया ज्योतिरश्नेत्।
देवो नो अत्र सविता न्वर्थ
प्रासावीत् द्विपत्र चतुष्पदित्यै॥
—Rg Veda, 1.124.1

When the sacrificial fires are ready, (ie, when people are ready to work) in the early morning, Uśā dispels darkness and brightens the world, just like the sun brings light. O God of Light, Savitā, please bring wealth and cattle to us soon.

अमिनती दैव्यानि व्रतानि
प्रमिनती मनुष्या युगानि।
ईयुषीणामुपमा शश्वतीना-
मायतीनां प्रथमोषा व्यद्यौत्॥
—Rg Veda, 1.124.2

Uśā is the protectress of noble deeds. She enhances the life-span of human beings (by bringing light and thereby food, wealth, etc). She is eternal like the moving animals (because their progeny renew their species). She is the greatest among those (consciousness, speech, etc) which are born with dawn.

प्र बोधयोषः पृणतो मघोन्य-
बुध्यमानाः पणयः ससन्तु।
रेवदुच्छ मघवद्भ्यो मघोनि
रेवत्स्तोत्रे सूनृते जारयन्ती॥
—Rg Veda, 1.124.10

O wealthy Uśādevī (*maghoni*)! Awaken the intellect of sacrificers (ie, those who work)! Let those who are against our doing good works go to eternal sleep. Please bestow wealth on those who sacrifice (ie, give away). O ruler of pious human beings (*sūnṛte*)! You reduce living beings, but bestow wealth on the one who adores you.

A Prologue to Yoga

EDITORIAL

Of the various classes of Sanskrit literature, *sūtra* or aphoristic literature is both absorbing and important. Numerous books have been written in aphoristic form since ancient times, and some such books have become the fountainheads of great philosophical schools. The *Brahma Sūtras*, which is the cornerstone of many schools, and the *Yoga Sūtras*, which is the foundation of the universally renowned yoga, are the best examples of this.

What is an aphorism? An aphorism is that form of writing which contains as few letters as possible, as universal an idea as possible, and as little ambiguity as possible. A verse in Sanskrit says that an aphorism is 'of very few letters, of absolutely no vagueness, a gist of a great idea, universal in application, and without any repetition or faults at all.'¹

One of the best examples of aphorisms is the second aphorism of Patanjali's *Yoga Sūtras*. In this one aphorism is embedded the whole of yoga. This aphorism is, '*yogaḥ cittavṛtti nirodhaḥ*, yoga is restraining mental modifications.' Though this aphorism appears to give only a commonplace definition of yoga, it is far deeper than that. We attempt a simple study of this great aphorism here. In this aphorism there are four terms: *yoga*, *citta*, *vṛtti*, and *nirodha*. We shall take them up one by one and try to see how the whole of yoga is dealt with in this aphorism.

Yoga

Suppose you are seeing a series of dreadful dreams. You see that somebody is being

killed, your dear one is crying, you are being tortured, someone has met with an accident, a lion is attacking you, there is fire all over, and a host of similar tragic things. You will be acutely pained, scared, and desperately nervous. But when you wake up, what do you find? Do you find anything you saw in the dream to have taken place in real life? Rare chances apart, you are unharmed and so are those you saw in the dream. It was just a dream and you have no bond with it at all.

We are all seeing dreams. We are all suffering on account of the myriad, endless dreams that we are seeing. Should we not wake up from sleep and end our meaningless suffering? To wake us up from sleep and stop us from seeing this horrible dream, the compassionate sage Patanjali gave a scientific scheme. And that scheme is yoga.

What could be the reason for our seeing these endless dreams? There are only two realities, *Puruṣa* and *Prakṛti*. There are endless number of *Puruṣas* but only one *Prakṛti*. *Prakṛti* is constituted of three qualities (*guṇas*): knowledge-producing (*sattva*), activity-inducing (*rajas*), and inertia-inducing (*tamas*). These three qualities combine in various ways to fashion this universe and ourselves. Of the billions and billions of *Puruṣas*, except for one, all others are imprisoned in a peculiar prison of four cells in this universe called *kleśa*, *karma*, *vipāka* and *āśaya*, one successively leading to the other. Only one *Puruṣa* is totally free from the touch of any of these: He is eternally perfect, full of knowledge and bliss. He is God. The rest of us are imprisoned. It is owing to this imprisonment that we are suffering.

In Patanjali's yoga, there are two words which give the gist of the whole thing: *svarūpa* and *sārūpya*. The first word means 'one's own

1. *Alpākṣaram asandigdham*
sāravat viśvatomukham;
Astobham anavadyam ca
sūtram sūtravido janāḥ.

real nature' and the second, 'taking the shape of that we are near to.' When we are dreaming this endless horrible dream called the world and ourselves, we are 'taking the shape of that we are near to.' We are not what we are. To be what we are, to be freed from the clutches of the three qualities which are the sources of all creation and chicanery, to go back to our own 'real nature', is the natural goal of yoga.

What is yoga? 'Yoga means samadhi, *yogaḥ samādhiḥ*,' says Vyasa, the great commentator of Patanjali's yoga aphorisms. Yoga, therefore, does not mean union here—either with God or with the Self; it is the attainment of samadhi. This samadhi is of two types: *saṁprajñāta* and *asaṁprajñāta*.

In a day, how many thoughts do we think? Can they be counted? But when a person's mind has only one thought constantly for a long time, he is said to have attained yoga, and the samadhi he has attained is *saṁprajñāta* samadhi (*sabīja* samadhi). But this is not all. There is a higher stage. When the person gives up, through supreme renunciation (*para vairāgya*), all the wonderful goods that *saṁprajñāta* yoga brings—like supernatural powers which awaken the capacity of clairvoyance (*mano javitvam*) etc, or *viśoka* which awakens powers like omniscience etc—and contemplates further, a stage comes when there will be absolutely no thought in his mind at all! Such a unique state (*nirbīja* samadhi) is called *asaṁprajñāta* samadhi. This *asaṁprajñāta* samadhi is the highest state possible to attain. In this *asaṁprajñāta* state, the goal of 'one's own real nature', *svarūpa*, is attained. Whose *svarūpa* is it? It is the *svarūpa* of the witness, the seer, the Puruṣa. Now, just as when we wake up from a terrifying dream its memory lingers for some time, though the *svarūpa* is attained there will be the residue of *saṁskāra*, which will eventually dissolve. It is in this highest state that liberation from the hold of Prakṛti is attained. This liberation from Prakṛti, the great magician who had made us sleep and go on dreaming bad dreams, is called *kaivalya*. Thus, the goal of

yoga is not merely controlling the mental modifications, but the attainment of *kaivalya*. Thus, the complete definition of yoga is said to be, 'yoga is controlling the mental modifications in order to remain in the pure witness state (*draṣṭuḥ svarūpe avasthānārtham citta-vṛtti nirodhaḥ yogaḥ*).' Attaining the *asaṁprajñāta* state is a long-drawn process.

The *saṁprajñāta* state also is yoga because there the individual can see the ideal he has chosen to concentrate upon as clearly as the palm of his hand, say the commentators. The greatness of Patanjali's yoga is that according to him samadhi can be attained in all mental states (*sārvabhauma* yoga). That is, a person can attain samadhi even though he may be in any state of mind—uncontrolled (*sarvārtha*), one-pointed (*ekāgra*), or perfectly still (*niruddha*). But not all ordinary stilling of thoughts lead to yoga or samadhi. Sri Ramakrishna tells M, the recorder of *The Gospel of Sri Ramakrishna*, in two places (pp. 350 and 702) that when the mind is suddenly withdrawn from all sense-objects and united with God, it is called *unmanā* samadhi. Such samadhis, however, are temporary and do not lead to *kaivalya*. 'But that samadhi does not last long. Worldly thoughts intrude and destroy it. The yogi slips down from his yoga,' Sri Ramakrishna adds. Before attaining the great state of *saṁprajñāta* one passes through at least four stages of samadhi.

In the first stage of yogic perfection, the aspirant goes into *vitarka* samadhi. Yogic concentration or meditation will always be on an object and never on the subject (ie, the atman) like in Vedānta. The object itself may vary: a cow in front of the seeker, the tip of his nose, his own thought, knowledge which comes in sleep, a saint, *praṇava*, breath, 'I-ness', or anything that appeals to him. These concentrations on various objects are classified into three broad groups: *grahīta* (the seeker's I-ness), *grahaṇa* (internal objects like thoughts, breathing, etc) and *grāhya* (external objects). (*Tarka* also means a thing, an item according to logic.) By concentrating the mind on a

purely external thing, the yogi attains the samadhi called *savitarka*. But in this samadhi, there is the idea that 'I am enjoying samadhi' (*asmitā*), the joy of having attained samadhi (*ānanda*) and thought of the differentiation of 'I' and the object of concentration (*vicāra*). When, in a higher state, the object of concentration is the reflection of the external object on the mind, a mental picture, it is called *savicāra* samadhi. Here, though the external object is not there the false identification (*asmitā*) and joy of samadhi (*ānanda*) are there. In a still higher state, when the object of concentration is the source of joy, say, a place where breathing is controlled, or the *suṣumnā*, it is called *ānanda* samadhi. Here, the I-ness (*asmitā*) is still there. A higher state than this is when one concentrates only on the idea that 'I am.' The samadhi attained now is called *asmitā* samadhi. Even this state is lower. But when the yogi attains such higher states, he gains greater knowledge, which cannot in any way be compared to ordinary knowledge. Through these samadhis, he attains the knowledge called *ṛtambharā* and comes closer to Reality. He experiences the light of the Puruṣa, called *prajñā*, reflected on the *buddhi*. Puruṣa can never be perceived directly. When the *asmitā* state is attained, the practice of samadhi becomes habitual and a *vr̥tti* called *viveka-khyāti* (the knowledge of the difference between the Puruṣa and Prakṛti) arises in the mind. This *vr̥tti*, also called *pratyaya* as it gives higher knowledge, when nurtured through steady contemplation, will lead the aspirant to *samprajñāta* samadhi.

We are all suffering. Though we may think that there is both joy and sorrow here, Patanjali says that for a wise person everything is misery only (*sarvaṁ duḥkaṁ vivekinah*). We should overcome suffering. So suffering is what is to be avoided (*heya*). What is the cause of this endless suffering (*heya-hetu*)? It is thinking that the dream is the reality, to use our illustration. Or, it is *vr̥tti-sārūpya*, false identification with mental modifications, to identify the Puruṣa with Prakṛti. Just because

a prism is near a red flower it appears red, though it is colourless. Such is our case. We must give up this 'taking the shape we are near to' (*hāna*). How to do this (*hānopāya*)? The most wicked man has flashes of one or two good thoughts occasionally even as the greatest saint sees to his dismay that one or two bad thoughts flash very rarely in his mind and disappear. We should nurture these rare good thoughts (*jñāna-vr̥ttis*), of which *viveka-khyāti*, the knowledge of the independence of Puruṣa from the clutches of Prakṛti, is the best. By doing this, we attain yoga. That is the goal.

Citta

We saw that the supreme goal is to attain *asamprajñāta* samadhi and with that, *kaivalya* or freedom from the hold of Prakṛti. What is the rope with which Puruṣa is tied to Prakṛti? The rope is called *citta*. This rope has two ends: we can either go towards the Puruṣa or towards Prakṛti. *Sattva* and *tamas* are opposites like light and darkness. If the knot on the Puruṣa side is *sattva*, the knot on the Prakṛti side is *tamas*.

What is this *citta*? *Citta* is mind-stuff. Patanjali calls *citta*—the inner organ responsible for all thought-waves, the storehouse of *saṁskāras*, fruits of actions, etc—a ground (*bhūmi*). It is on this ground that the play of numerous thoughts take place. *Bhūmi* also means 'state'. There are five states of the *citta*. These states are, the absolutely unsettled (*kṣipta*), the dull (*mūḍha*), the less concentrated (*vikṣipta*), the one-pointed (*ekāgra*) and finally, the absolutely tranquil (*niruddha*). According to Patanjali, lesser stages of concentration or samadhi are possible in all the *bhūmis*. *Samprajñāta* yoga is possible only beginning with the *ekāgra* state.

The *Taittiriya Upaniṣad* speaks of five *ātmās*. We can compare these *ātmās* with the stages of the *citta*'s progress here. When the *citta* is dull it is concentrated only on bodily appeasements and so it can be said to be engrossed in the *annamaya ātmā*. When it is agitated, it is restlessly active and so it can be said to be engrossed in the *prāṇamaya ātmā*, as

prāṇa means vibration. When the *citta* is less controlled, it can be said to be engrossed in the *manomaya ātmā*. When it is one-pointed, it can be said to be engrossed in the *vijñānamaya ātmā*. When it is perfectly restrained, it can be said to be engrossed in the *ānandamaya ātmā*. So when the *citta* is perfectly restrained, the Puruṣa shines in all his glory.

We can compare the *citta* to a circus ground. You must have seen big circus companies pitching their tents in your town or city occasionally. It was a bare ground before; all of a sudden, you see a huge tent. Then there are lions and monkeys, tigers and horses, men and women, chairs and benches, all sorts of gymnastics, noise, crowds—a stunning exposition. Some days later, the circus company leaves the place. Even if there is a single bamboo piece lying on the ground, it reminds you of the circus. When that also goes, there is the memory of the circus for some days. Finally, everything is gone. Similar is the case with the *citta*. When it is in the *ekāgra bhūmi*, the concentrated state, *saṁprajñāta* samadhi is attained. When the *citta* rises still higher and there is absolute tranquillity with no *vr̥tti* at all, *asaṁprajñāta* samadhi is attained. Even here, like the memory of the circus, there will be one or two *saṁskāras* remaining. They, too, will disappear soon and Puruṣa attains liberation.

Vr̥tti

The third vital term in the sutra we are considering is *vr̥tti*. Everything that happens is in the domain of the three *guṇas*. It is true in the case of *vr̥ttis* also. The millions of thoughts that arise in our mind are all *vr̥ttis*. For what reason does a *vr̥tti* arise on the ground of the *citta*? The *rajas* aspect of the *citta* goads the mind to activity (*pravṛtti*). This activity is what gives rise to *vr̥ttis*. It is the *vr̥tti* that brings knowledge to us. Without the *vr̥tti* there is no knowledge at all. A *vr̥tti* may rise, all right; but its knowledge is gained owing to the *sattva* aspect of Prakṛti. The *sattva* aspect reveals knowledge and its function is called *prakhyā*. Everything that we know about the

external world or internal world comes to us in the form of *vr̥ttis*. We either get attached or become averse to the source of this knowledge because of our false identification (*asmitā*) with the object. This attachment (*rāga*) or aversion (*dveṣa*), which is born of ignorance (*avidyā*), leads us to perform both good and bad actions. These actions will not end with our completing them: they produce fruits or effects, and these fruits are stored in the mind as *karmāśaya*. This storing up is owing to the third quality, *tamas*, whose nature is inertia (*sthiti*). This *karmāśaya* fructifies and produces three effects: birth (*jāti*), life-span (*āyus*), and suffering (*bhoga*). *Bhoga* is suffering because, as we quoted Patanjali earlier, everything is suffering for a wise person. A thief sees a gold chain lying on the road; the seeing is because of the *vr̥tti* which carries information to the mind. When the sense organs carry the information to the *citta*, the *citta* recognizes it as a gold chain on account of past experience. This knowledge instantly makes him desire the chain. He gets identified (*asmitā*) with that chain and hates and fears the person who is the real owner. The thief may wish to snatch it away from him and perhaps do that also. This action is bad and leads to some consequences. The consequences, called *karmāśaya*, gets stored in the mind. In time, according to intensity, they fructify (*vipāka*) and that leads to suffering. Thus—knowledge, love or hate, action, result, rebirth, again knowledge—this cycle continues endlessly. Then there is the fear (*abhiniveśa*) of being annihilated; this is the fifth bondage.

A *vr̥tti* is a mental modification. *Vr̥ttis* go on rising in the mind or *citta* in extremely quick succession. Though there are millions of *vr̥ttis* rising in the *citta*, they have been classified into five broad groups. These are: valid knowledge (*pramāṇa*), wrong knowledge (*viparyaya*), conceptual knowledge (*vikalpa*), sleep knowledge (*nidrā*) and memory knowledge (*smṛti*). Patanjali accepts three types of valid knowledge: direct experience (*pratyakṣa*), inference (*anumāna*), and verbal

testimony (*śabda*). A *vr̥tti* arises upon the contact of any sense organ with an external or internal object and we have the knowledge of it; that is direct experience. When we see smoke on a hill and infer that there is fire there, it is inferential knowledge—the *vr̥tti* that brought us the knowledge of the smoke awakens the previous knowledge of the relation between smoke and fire. When we hear that Patanjali guides us how to wake up from dream, we believe him because he was a divine yogi. This belief in great people's and scriptural words is verbal testimony. These three form valid knowledge. Then we have *viparyaya* or false knowledge. The *vr̥tti* that brings us the idea that there is a snake in the room is proved wrong later because it was just a rope; this is wrong knowledge. Conceptual knowledge is framing ideas. We say, 'that man is brilliant,' 'this man is powerful,' etc. This is conceptualization born when a *vr̥tti* about the person arises in the mind and we conclude something about him. The *vr̥ttis* that arise in deep sleep (*susupti*) give us the knowledge of sleep. The last one is memory (*smṛti*). This is very important. When we see an aeroplane, its *vr̥tti* has arisen in the mind and we come to know that it is a plane. Now, if owing to ignorance we identify ourselves with the plane in some way ('I want to fly,' or 'I want to be a pilot'), this *vr̥tti* becomes powerful and leaves behind an impression called *saṁskāra*. Suppose we enjoy a trip. This *vr̥tti* no doubt leaves behind an impression; it also leaves another impression called *vāsanā* on the mind. This *vāsanā*, popularly called 'desire', instigates the mind to repeat the plane trip. If we ignore it with a strong will power, it will go away without doing any harm. If, however, our will is not that strong, the *saṁskāra* or the joy of plane trip awakens and forces us into action again. *Saṁskāras* are subliminal impressions in the mind—their value is only psychological in that they give rise to *vr̥ttis* called memory *vr̥ttis*. But when we are forced to perform actions according to their whims, we create related *karmāśayas* and owing to

ignorance, this will lead to birth, living, and suffering.

Thus we see that it is the *vr̥ttis* that bring knowledge. Since there is the duality of good and bad in the created world, the *vr̥ttis* too are classified into good and bad. Those which do not bind (*akliṣṭa*) are good, and those that bind (*kliṣṭa*) are bad. As we saw above, when ignorance (*avidyā*) gets associated with a *vr̥tti* ('this is mine,' 'I am afraid,' 'I hate it,' etc) it becomes a *saṁskāra*. This subliminal impression goads the person to further action and thus binds him to the cycle of birth and death. Hence all *avidyā vr̥ttis* which (a) are born of *kleśas*, (b) cause *kleśas*, and (c) make the individual perform good and bad actions, are called *kliṣṭa vr̥ttis*.

The five *kleśas* are ignorance: (*avidyā*), which is the root of the *kleśa* tree, I-ness (*asmitā*), love (*rāga*), hate (*dveṣa*) and fear of annihilation (*abhiniveśa*). It is these *kleśa vr̥ttis* that lead to bondage and misery—the continued dreaming as we saw in the beginning. We must restrain the *kleśa vr̥ttis* and entertain *akleśa* ones; that is, nurture those that lead to liberation. The river of *citta* flows towards both good and bad, says the commentator Vyasa. It can take us either towards good or towards bad. All of us have both good and bad inclinations. It is for the seeker to cultivate the good ones, called *jñāna-vr̥ttis*. By the process of austerity (*tapas*), study of and meditation on scriptures (*svādhyāya*), and worship of God (*īśvara-praṇidhāna*), known as *kriyā yoga*, the *kleśas* are either attenuated (*tanūkaraṇa*) or burnt (*dagdha bīja*) or they merge into their source, Prakṛti (*pratiprasava*). There arises the knowledge which is also a *vr̥tti* called *viveka-khyāti*, which reveals the Puruṣa as reflected in the *buddhi*. This *prajñā* leads the individual to *samprajñāta* and *asamprajñāta* yogas.

This is about *vr̥tti* then. What about the *karmāśaya* or the effects of past actions? Effects of past actions fructify (*vipāka*) only if there are *kleśa vr̥ttis*, principally ignorance, because these *kleśas* goad the individual to repeated

actions. Once these *kleśas* are either attenuated or burnt through austerity, study and worship of God, the *karmāśaya* will be useless and ineffective. That is, there is no more suffering or rebirth.

Nirodha

The last term in the aphorism we are studying is *nirodha*. Since time immemorial, the Puruṣa has been in the clutches of Prakṛti and the goal of yoga is to free the Puruṣa from her hold. To do this, what is needed is the controlling of the *citta vṛttis*. Consistent practice (*abhyāsa*) and firm resolution to give up those that are not helpful in the path (*vairāgya*) are the two wheels that take the vehicle called yogi to the threshold of *kaivalya*. Patanjali gives the famous eight-limb method for achieving this.

Of the eight limbs, the first is *yama*, which means the attainment of perfection in virtues like non-injury (*ahimsā*), truthfulness (*satya*), non-stealing (*asteya*), continence or self-control (*brahmacarya*), and non-covetousness (*aparigraha*). The second limb is *niyama* or perfection in mental virtues, which include internal and external purity (*śauca*), contentment (*santoṣa*), austerity (*tapas*), study of and meditation on scriptures (*svādhyāya*), offering all actions to God (*īśvara-praṇidhāna*). Patanjali has taken the last three separately and highlighted them as *kriyā yoga*. The next limb is *āsana* or right posture. Correct posture helps gain will-power, bodily health and vigour, and yogic balance. The fourth limb is *prāṇāyāma* or breath-control. Proper breathing and breath-control lead to thought-control. The fifth limb of yoga is *dhāraṇā* or concentration. Concentrating the mind on any external object or internal object leads to

meditation. *Dhyāna* is the next limb. Like the flow of oil from one container to another, the *citta* should constantly have the *pratyaya* of the desired object alone. *Samādhi* is the final limb of yoga. This is the goal, as described in the early stages. These eight limbs lead to *asamprajñāta* yoga and the liberation of Puruṣa. But to practise these eight limbs is not all that easy. There are several obstacles, of which ill-health (*vyādhi*), dullness or stagnancy of the *citta* (*styāna*), doubt about the path chosen (*saṁśaya*), repeated mistakes during practice owing to negligence (*pramāda*), and laziness (*ālasya*) are some. To overcome these obstacles, repeated effort, renunciation, thinking of God, etc are suggested as remedies. The *citta* sometimes becomes numb or agitated owing to various reasons: irritation from others, habitual experience of suffering, etc. During such circumstances, it has to be kept cheerful by harbouring friendship (*maitrī*) towards good people, compassion (*karuṇā*) towards the miserable, helping, serving and encouraging (*mudita*) those who perform good deeds, and ignoring (*upekṣā*) those who are bad. There may be numerous other obstacles in the form of allurements on the path of a yogi like the awakening of various powers in him. All these have to be firmly renounced. There are many lower samadhis which bring about a tendency for samadhi in the aspirant's mind. These will finally lead to the culmination of yoga, when the Puruṣa stands in all glory of his own nature, freed at last from the hold of Prakṛti.

In this way, a single aphorism can contain a great school of thought, and that is the greatness of the sutra literature. □

Good Work Produces Good Results

There is no kind of work that does not produce results, or that is wasted or lost. Work will invariably bear its fruit, good or bad, some time or other. For this reason what is good should by all means be done. Such action becomes itself converted into capital, out of which the debt of evil deeds and the accumulated mass of sin are paid off.... The fruit of good deeds is inexhaustible. The more it can be accumulated, the more it stands one in good stead in this life and in the next—in dangers, pain or bereavement, in struggles and temptations, in darkness, fear and despair.

—Swami Virajananda

IMAGES OF INDIA'S PAST

The Dedicated

1299 CE. Alauddin Khalji sent his commanders Ulugh Khan and Nusrat Khan with a large army to capture Ranthambhor in Rajputana. Rana Hammir was its king—a brave leader of his people. Of the two commanders who came to Ranthambhor, Nusrat Khan was killed when a stone catapulted from inside the fort struck him and proved fatal later. With his 200,000-strong army, Rana Hammir attacked the Khalji army; Ulugh Khan had to retreat. It took almost a year for Alauddin Khalji to himself come to Ranthambhor with a large army. But even a full year of siege could not do any harm to Ranthambhor. At last, the desperate Alauddin used sandbags to negotiate the fort and forcibly took possession of it. Hammir's female relatives committed *jauhar* and the Rana attacked the Khalji army. After a fierce battle, Hammir's garrison was hacked to death. *Hammira-mahākāvya* says that the hero, Hammir, cut off his own head, instead of dying in disgrace. All this could not have happened had there not been a traitor in Ranmal, the Rana's minister. But there were faithful people too. Mir Muhammad Shah was a Mongol who worked for Rana Hammir. After war, he lay in a pool of blood. Alauddin went to him and asked him what he would do if he was cured. 'If I recover from my wounds, I would have you slain and raise the son of Hammir Deo upon the throne,' said the hero. This wounded Alauddin's pride and he ordered the hero to be trampled to death by an elephant (cf. Iswari Prasad, *Medieval India*, pp. 248-51).

Stupendous!

An old and authentic work, Sir William Wilson Hunter's *The Indian Empire* (London: Smith, Elder & Co, 1893), is devoted to an objective description of Indian history, culture, business, industry, and so on. The third volume gives statistics of past Indian trade and industry. We cite only a few statistics here, using the author's own words: 'Jute manufactures [are]...entirely the produce of the Calcutta mills. In 1877-78, the total export of jute manufactures was valued at Rs.771,127, and in 1879-80, at Rs.1,098,434. ... During the thirty-six years between 1835 and 1871, the value of merchandise exported from India amounted to Rs.1012 millions, say one thousand millions sterling. ... Of European countries, France, Germany, Belgium, Italy and Austria alone deserve notice beside England. ... In 1872-73, the total exports from India to China were valued at Rs.12,074,347. In 1877-88, the Indian exports to France reached the large total of nearly Rs.6 million, consisting chiefly of oil-seeds, cotton, indigo, silk, and coffee. ... In 1890-91, the exports to France amounted to Rs.7,879,269. ... The exports to Germany were valued at Rs.4,395,097. ... The trade with the United States comes next to that with Belgium, aggregating a total for exports and imports of Rs.5,503,992. ... In 1873-74, which may be regarded as a normal year, the total number of vessels engaged in the coasting trade...was 294,374, with an aggregate of 10,379,862 tons. Of the total number of vessels, 280,913, with 4,843,668 tons, were native craft.'

On Guru, Advaita, and the Avatar Concept

SWAMI RANGANATHANANDA

Swami Ranganathanandaji Maharaj, currently President of Ramakrishna Math and Ramakrishna Mission, conducted, during one of his annual three-week lecture tours of the USA, this illuminating question and answer session at the request of Swami Bhashyananda, the then head of the Vivekananda Vedanta Society, Chicago. In the February, March, and April issues of the Prabuddha Bharata, three parts of the account of the session appeared under the heads of (1) On Conversion, Real Teachers, etc, (2) On Reincarnation and (3) On Vedanta, Christianity, etc. In this issue, we publish another part.

Question: *I was wondering what it means to accept some one as guru in your tradition.*

Swamiji: In spiritual life, especially in the paths of devotion (bhakti) and knowledge (jnana), a time comes when you begin to feel the need for guidance—a little help—so that your path can be more steady. It is at such a time, when your heart is feeling the need, that you seek a guru. Then that guru's help will be really effective. I have seen people telling me, 'My spiritual life was going on; just now I had initiation from a guru; my mind has become steady; I feel a wonderful strength coming to me.' A Dutch lady told me that she went by plane all the way to Calcutta for two days, just to get a *mantra* from the President of the Ramakrishna Order. Later, she wrote to me from Holland, 'I feel tremendously strong. Great stability has come to my life. I feel very happy.' When you are a spiritual seeker, the needed help comes to you at the right time; that makes you stronger in your resolve.

Question: *You mentioned about the predominance of the dogmatic element in Western Christianity, and that the spirit of the transcendental element was perhaps a minor extension of this. Perhaps, the classical description of Christianity has been that these are not individual elements, but they are a synthesis. They both are required, the structural and denominational on one side,*

and the transcendental on the other. But, do you see in the evolution of Hinduism, from the non-dualistic to dualistic, from Sankara to Madhva, that development of comprehensiveness to make the proper equilibrium of these two elements?

Swamiji: In Christianity, I am afraid, there is no transcendental or impersonal God. As I said earlier, the German mystic Eckhart peeped into it but was castigated by the Roman Church. Today, Indian philosophical and spiritual thought is engaged in harmonizing the different outlooks and experiences of Dvaita, Viśiṣṭādvaita, Advaita, and many other strands in between. In Christianity, the impersonal concept of religion did not find a place, and that is because of too much stress on the historical element of religion. At a particular period, the birth of Jesus Christ occurred, then religion came, and salvation came. When you stress the historical, then naturally, there cannot be any place for the transcendental and impersonal aspects of the Divine. If the transcendental, Advaitic or non-dualistic aspect was there, that would have been a wonderful development. Christianity would have developed, with respect to its own various denominations, a unifying attitude. That did not happen; that was not possible in Christianity. For example, I often used to wonder whether there is a Christianity or a Christian religion at all; there are only denominations: Catholic, Protestant, Russian

Orthodox, Methodist, Baptist, Anglican, etc. But where is that Christian religion which embraces all these various denominations? That would have been the true Christian religion—transcendental, Advaitic or non-dualistic religion, embracing all Christian denominations. That alone could be the Advaitic or non-dualistic and impersonal Christianity. Up to that transcendental level, all religions are dualistic only. That transcendental level was not developed in Christianity. I used to say, if there was an Advaitic Christianity, it would have accepted all these dualistic sects and denominations of Christianity, and established harmony and peace in the West, and could have avoided all those persecutions, violence, the Thirty Years' War, etc practised by the Catholic Church for several centuries. That is why atheism also developed in the West, and such remarks as 'religion is the opium of the people.'

India, because of the Advaitic aspect of Vedanta, developed this capacity to harmonize all dualistic religions. That is why Sankaracharya, though represented as a teacher of Advaitic jnana path, was also essentially a great devotee of the personal aspect of the Divine, and has composed many inspiring devotional hymns which are very popular in India, like the 'Bhaja Govindam' *stotram*. He was the one who strengthened our bhakti path, based on devotion to the personal aspect of the Divine, and brought about a harmony among the various dualistic sects in India and made way for her unique spirit of harmony with non-Indian religions too. From him came tremendous strength for all the bhakti religions based on the personal God. He composed beautiful hymns to Siva, Devi or the Divine Mother, Vishnu, and Krishna—all these he did to strengthen the bhakti religion in India. That was Sankara's contribution in this field.

Earlier, even from the *R̥g Vedic* period itself, about four thousand years ago, the spirit of harmony and concord had started to inspire India through one brief Vedic utter-

ance: '*Ekam sat viprā bahudhā vadanti*, Truth is one, sages call it by various names.' Later the development of the Advaitic thought and the truth of the impersonal-personal God of the Upanishads further strengthened this inter-religious harmony.

Jnana and bhakti became combined in Sankaracharya, though, later, the Sankara movement started stressing more and more the jnana side and not so much the bhakti side. That is being corrected today by Sri Ramakrishna and Swami Vivekananda. Therefore, the harmony among the various spiritual paths comes from the central thread of spirituality present in all of them. That will be the method India will adopt in the modern period also, because of the high prestige of that Advaitic vision, which is full of compassion, understanding, and comprehension. If India has been very, very tolerant in the field of religion, unlike all other countries, it is all due to that Advaitic vision, which says, in the language of the third century BC rock and pillar edicts of the Mauryan Emperor, Ashoka: In religion, '*samavāya eva sādhuḥ*, concord alone is right and proper.' That is the fruit of the Advaitic vision. In India, Advaitins alone have felt this beautiful idea of harmony between various dualistic religions and Advaita. No dualistic religion can find harmony with other dualistic religions. They tend to conflict with each other. In Christianity, therefore, if an Advaitic element enters, then what will happen? 'I am a Christian. You may be a Roman Catholic, or a Russian Orthodox, or a Protestant, it doesn't matter; you are my brother. We are all Christians.' This feeling will come and that is the Advaitic way. Christianity is one, Christian paths are many. Till now, no such Christianity, accepting all Christian paths as its own, has developed. It is the same with Islam also. There is no Advaitic Islam which can own all its paths—Shia, Sunni, Bahai, and Ahmadiya. As of now, the predominant Sunni Muslim state strives to weaken or even eliminate all other Islamic denominations. Shias are persecuted

in Sunni dominated Pakistan; Pakistan has also passed a bill in its Parliament, declaring Ahmadiya Muslims as non-Islamic. But all these Islamic denominations are living in peace and harmony in India!

Building up a unified Christianity will involve this understanding of an Advaitic vision of Christianity, of which all Christian sects are but various expressions. That, I am sure, is developing in the modern age. All dualistic religions are narrow and intolerant. As soon as they come under the Advaitic influence, they become broad and tolerant. Some of the Christians in India are highly respectful of this Advaitic element, not as opposed to Dvaita, but as including Dvaita. That is how Sankaracharya and his grand-teacher, guru's guru, Gaudapada, of the seventh century AD, have expressed the range of Advaita. I am quoting three verses from the *Māṇḍūkya Upaniṣad Kārikā* by Gaudapada on which Sankaracharya has written a wonderful commentary:

*Sva-siddhānta-vyavasthāsu
dvaitino niścītā dṛḍham;
Parasparam virudhyante
tairayam na virudhyate.* [3.17]

Every Dvaita or dualistic system is deeply engaged in establishing the truth of its own system, and thus it comes into conflict with other dualistic systems; with all these conflicting systems, this Advaita or non-dualistic system has no conflict.

*Advaitam paramārtho hi
dvaitam tadbheda ucyate;
Teṣām-ubhayathā dvaitam
tenāyam na virudhyate.* [3.18]

Advaita is the supreme truth and Dvaita or dualism is said to be an aspect of Advaita. To the dualists both are dualistic. But with such dualistic views, this Advaita has no conflict.

*Asparśa-yogo vai nāma
sarva-sattva-sukho hitaḥ;
Avivādo'viruddhaśca
deśitas-tam namāmyaham.* [4.2]

This Advaita is well known as *asparśayoga*—yoga of 'non-touch' or non-duality. It is de-

voted to the happiness and welfare of all beings. It is without any disputation and contradiction. I salute the one who taught this truth.

That is one aspect of the greatness of this *Māṇḍūkya Upaniṣad* and its *kārikā* by Gaudapada. That comprehensive vision is a great gift of India's Advaita, by which India became largely free from sectarian intolerance, violence, war, or even persecution of atheists or agnostics. Generally, dualistic religions will persecute atheists and agnostics. That has not taken place in India. They were also respected, and that is the India even of today. Everybody is free to practise religion, or to do without religion and live as an agnostic. That is also in free India's Constitution today and the people welcome that provision in our Constitution.

Question: You talked about Jesus Christ as a historical divine incarnation, and sometimes I hear people talking about Sri Ramakrishna also as an avatar, or divine incarnation; he is a unique being. Would you compare the two incarnations, Jesus Christ and Sri Ramakrishna, and do you see Sri Ramakrishna as a unique being in India and also as a cosmic person?

Swamiji: For the Hindu, there is no difficulty at all. God comes again and again. 'Sambhavāmi yuge yuge, I come again and again' as a human being, whenever there is a need for a spiritual adjustment. That is the central teaching about incarnation in the *Gītā* and also in many other holy books. How do we improve the religious condition of the people? India says, 'A divine personality alone can do it.' No scholar or priest or even a saint can ever do that. Only a divine person can do that. Just like when Jesus came, religion was so shallow—full of superstition, priestcraft, etc. He brought a tremendous spiritual message. That is what Jesus did. A person of that calibre alone can teach religion as a world-moving force. Christianity made a mistake by making Jesus as the only begotten Son of God. Did God practise family planning! There is nothing final in spiritual life.

Science During the Past Millennium: A Survey

PROF N. V. C. SWAMY

In our January 2000 number, we carried an article by Prof Jayant Narlikar on astronomy. Here, Prof N.V.C. Swamy gives an excellent and sweeping survey of the entire gamut of science during the last millennium. 'It has been a difficult job trying to decide what to include and what to exclude,' wrote Prof Swamy in his letter, and added, 'I have used the style adopted generally by scientists when they write about science for the general reader.' Prof Swamy was formerly director of IIT, Madras, one of the most prestigious institutions of India.

Introduction

Science, as we understand it today, is a product of the West. It had its origins in ancient Greece about 2500 years ago. Since then it progressed by fits and starts until the end of the seventeenth century, mainly because of the social and political upheavals in Europe during this period. From then onwards, there has been a spectacular growth, culminating in the explosive proliferation during the twentieth century, leading to the cliché that as many scientists are alive and working today as ever existed between the dawn of civilization and the end of the nineteenth century.

It is the intention of this essay to trace the growth and development of science during the last thousand years. The subject is indeed vast and would fill several volumes. However, what is being attempted here is to provide a bird's-eye view of the progress and the twists and turns which influenced this progress.

Today, science is studied under several disciplines, which are increasing day by day. However, historically it has been classified under three major branches—physical, chemical and biological sciences. Though this classification is no longer valid, still it will serve our purpose of a quick flashback at the last millennium. Moreover, the story of scientific growth can be narrated by dividing the last thousand years into the following peri-

ods: (a) from the onset of the Dark Ages to the advent of Newton; (b) the eighteenth century; (c) the nineteenth century; (d) the pre-War years of the nineteenth century; and (e) the post-War years up to now. This division is purely artificial and is made only for convenience, though scientific growth itself knows no artificial boundaries.

Science at the End of the First Millennium

To appreciate the strides made by science during the last millennium, it is but appropriate to know where exactly it stood at the beginning of that period. At that time, science in Europe was the hobby of the clergy. It had made no impact on the common run of the people, because education was confined to the clergy who lived in monasteries. The language of scientific communication was Latin. The demigod of science, whose word was authority and disagreement with whom had been declared anathema by the Church, was the great Aristotle. Original thinking was frowned upon, because Aristotle had said everything that could be said on science. The geocentric hypothesis ruled the roost in astronomy, with the earth the centre of the universe. The Ptolemaic hypothesis of epicycloids had been accepted to describe the trajectories of all planets and the sun around the earth, even though it led to absurdities. Mathematics had not yet developed enough to become the vehicle of scientific informa-

There was a Small Girl...

Here is the astonishing story of a young girl who passed away some 75 years ago in May, at the age of nine. India has indeed produced such extraordinary lives!

Basanti Devi was born in the year 1917 in her maternal grandfather's village home in Bengal in the month of Chaitra 1323, Bengali Era (BE). Six months after his daughter was born, Naba Kumar Sastri left for Banaras along with his wife, Annakali Devi. Both Naba Kumar and his wife were devoted to studies, worship, etc. Naba Kumar had temporarily shifted to Banaras from his ancestral Bengal home in order to study the scriptures. A Brahmacharya Ashrama was established with the generous contribution of the king of Panchkot, and Naba Kumar Sastri was soon made the head of that institution. Sastri lived a wonderful life with his wife and daughter, training novices. He began to teach small Sanskrit verses to his baby daughter now and then and Basanti would pick them up with astounding quickness. By the time she was four, Basanti had learnt by heart many hymns and verses. The girl was of such rare calibre that if she ever heard a verse once, it would become indelibly imprinted in her memory. Naba Kumar was thrilled to witness the unusual brilliance of Basanti. He trained her in Bengali and Sanskrit. Within a very short time, she became a master in the Sanskrit lexicon *Amarakośa*, Sanskrit grammar, *Muk-tāvali*, Sanskrit literature, etc. By the time she was five, Basanti had acquired considerable mastery over the Sanskrit language apart from her mother tongue, Bengali. And when she was seven years old, this exceptional girl had a thorough mastery over such difficult texts of logic (Nyāya) like *Bhāṣā Pariccheda*, and had also become proficient in Patanjali's Yoga Darśana, Sāṅkhya, etc.

The pundits of Banaras of those days did

not fail to notice this genius. After thorough scrutiny, the scholars decided to bestow upon the girl a unique honour: they presented her with a citation and conferred upon her the title 'Saraswati'. These days titles and degrees can be had for a few pennies. But when women's education was still in its infantile stage, to decorate a small girl with such high honour was something unique in history.

Basanti Devi Saraswati's studies continued. By the time she was eight, Basanti had studied many important works in Bengali and had also learnt English and Hindi. History and mathematics were two other fields where Basanti Devi showed her ingenuity.



These apart, she had read the *Rāmāyaṇa*, *Mahābhārata*, *Bhāgavata*, and other sacred texts. She could go on repeating hundreds of verses from any of these books, and also from the *Gītā* and the *Candī*. Her listeners would be surprised at the way she could utter the exact verse at the exact time.

One day her father quoted a verse of Chanakya, which says: 'Displaying too much love and affection can give rise to many faults. On the contrary, by punishing at the right time many good qualities grow. So children and disciples should be punished and not cajoled.'¹ Naba Kumar told his daughter, 'Basanti, since this verse says so, if necessary I must beat you, is it not?' Little Basanti replied, 'The verse speaks only of *putra* (son) and *śiṣya* (disciple). It does not say anything about daughters. So according to the master of ethics, Chanakya, a daughter should not be

1. *Lālāne bahavo doṣāḥ tāḍane bahavo guṇāḥ;*

Tasmāt putrāṇca śiṣyaṇca tāḍayet na tu lālayet.

punished.' The father smiled and said, 'But in this verse the word *putra* is figurative only. It can mean both sons and daughters.' Basanti instantly replied, 'If that was the case, Chanakya would have used the word *apatya* (offspring) instead of *putra*.' The father said, 'If he had done that there would be an extra syllable in the verse...' The tiny girl replied, 'No, that is wrong. Instead of *tasmāt putrāñca śiṣyāñca*, Chanakya could have said, *tadapatyañca śiṣyanca*!' The father accepted defeat before his young daughter.

Basanti Devi was also a devotee. She would everyday worship Lord Shiva and then only partake of food. Her Vedic chants were melodious and clear and the pronunciation perfect. Great scholars would visit the Brahmacharya Ashrama and, after talking to Basanti, would say that she was a Gargi or a Maitreyi born again. Sri Panchanan Tarkaratna, the great pundit of yesteryears, had remarked about her, 'This little girl is some goddess who is born on account of a curse. As soon her karma is exhausted, she will leave.'

Basanti's devoted mother, whom she followed always like a shadow, expired in Banaras. Naba Kumar was extremely pained; all were concerned that this shock would tell upon Basanti's mind. But Basanti was unaffected. Not that Basanti did not love her mother. Her respect and regard for her mother was extraordinary. She loved her mother dearly. Yet, when her mother passed on, Basanti was as she ever was, calm and cool—yet another trait of true learning.

Some days after this incident, Basanti's father took his little daughter to his native village. Basanti became the darling of her father's relatives. Hearing about the girl's extraordinary qualities, people from various parts of the district started coming to Naba Kumar's village home to meet her.

One evening, a relative came and complained to her father, 'I saw Basanti walking on the bank of the lake all alone.' Her father told the girl, 'Why do you go there all alone,

Basanti? What will happen to me if something should happen to you?' Basanti smiled and quoted from the *Mohamudgara Stotra* of Sankara and some other related poems, which taught renunciation. When her father told her to promise not to go to the lake alone again, Basanti hit back with some more scriptural passages which said that one should never make such promises. Later on, Basanti brought a book and read out to her father an entire episode, where Gandhari witnesses the Kurukshetra tragedy and weeps. Her tone was so full of pathos that Naba Kumar wept bitterly. He asked her after she had completed the reading: 'My child, when there are so many beautiful incidents and episodes in this book why did you choose Gandhari's painful story?' In a grave tone, the girl replied, 'Father, Gandhari was a woman; yet she could somehow withstand the bereavement of her hundred sons and so many relatives. Remembering this incident, you too can withstand the pain of my departure.' Her father was stunned at her words.

That night, Naba Kumar had a strange dream. He saw that he had worshipped some goddess of brilliant splendour. After the worship, he saw that he had immersed the image in the pond behind his house. This dream woke Naba Kumar up. The strange dream had upset him. He somehow managed to take bath, and began his daily worship. After his worship, Basanti offered breakfast to him and returned reciting a verse aloud, which meant, 'Do not be proud of your youth, wealth, and fame. Time will swallow everything in a moment.' Then, along with another girl, a relative, she went to bathe in the pond that was behind the house. Both the girls were drowned that moment. The day was 5th Jyestha, 1333 BE (1926). The news of Basanti and her relative's drowning came as a shock to Naba Kumar, his family, and thousands of people. The father remembered his dream with tears and sorrow. □

Source: Obituary in *Manasi* (Bengali), Magh 1333 BE (1926)

The Aim of Life and its Fulfilment

PROF C. R. MAHATA

The author, a professor of electrical engineering at the College of Engineering and Management, Kolaghat in West Bengal, attempts a scientific explanation of the purpose of life and its end.

Life is a struggle for survival and for ensuring happiness. Willingly or unwillingly we all get involved in it. For many of us this is a quite difficult struggle, leaving practically no time to reflect on the aim of life itself. Most often, spending time on this question is nothing but intellectual speculation without any practical utility. Even then some very prosaic and rude incidents force us to introspect. Death is one such incident. When the life of a very near and dear person ends and his/her body gets slowly burnt to ashes, we ponder: What is the aim of our life? Thus, death is to be recognized as a very powerful agent in making us thoughtful.

Life invariably terminates in death. The sight of death and sufferings of life impelled prince Siddhartha to renounce the world and proceed to search for immortality. Siddhartha could correctly appreciate the aim of his life from a few common events. Then, for the fulfilment of that aim, he engaged himself in hard austerities. He decided that he would not stop though the body may get emaciated and even destroyed. Many of us also witness old age, disease, death and monks, but very few learn the lesson. We strain all our energies in trying to achieve something or make our children something. Transitory happiness ensues when that goal is attained. But, shortly thereafter, we find that either that desire was a wrong one, or many other things remain to be achieved further. Apart from this, the attraction towards something which is already achieved starts diminishing and may eventually vanish. Along with this, when one desire subsides, another arises, causing us to chase

it. In ordinary life, the chain of such successive desires or goals and running after them continues endlessly. And there seems to be no universally accepted goal or aim of life at all in ordinary parlance. Non-gratification appears to stand out as the universal tragedy.

Material science does not bother about these questions. Western philosophy also sidetracks them. But the aim of life and its fulfilment occupies the most important place in the socio-philosophical and religious thoughts of India. This remains the undercurrent in different discussions and expressions in various scriptures. But in this article we take up the question in an unorthodox and overt manner. It is true that human beings do not live by bread alone. But the guarantee of bread through a profession or otherwise does not engage everyone to search for the aim of life. Mostly it engages people in pursuits of sensual pleasures ending up with multiple kinds of miseries. But in the midst of all these disappointments, discriminating persons do not fail to identify the basic motivation which is nothing but the search for happiness. In fact, all the activities of life are directly or indirectly oriented to achieve happiness or bliss.

If there is something common amongst all endeavours and their motivations in our lives, it is nothing but the desire to attain happiness. Even addiction to the menacing social evils like drugs occurs due to the same desire. An erstwhile drug-addict frankly stated that, compared to all other kinds of pleasure known to ordinary people, drugs appeared to give much more intense pleas-

ure—only the catastrophe in the end will not be in view at the time of addiction. So life should be oriented to find happiness in a safe and sure way.

Though most people think that non-self objects like wealth, spouse, children, social honour, etc are the sources of happiness, and therefore, we hanker after these things, the majority opinion has little value in determining the truth. Apart from what saints and sages tell us, it must be decided through scientific method, namely through experiment, observation and logical analysis. We are living in an age of science. So, the method of science gives us a lot of confidence. Many people go further and think that all the religions and scriptures have become irrelevant with the advancement of science. But such an expectation from science or such scepticism about scriptures has no logical basis as we shall try to show.

We have five organs of knowledge: eye, ear, nose, tongue and skin. Light from the external objects falling on the retina of our eyes excites the light-sensitive nerves therein. Similarly, sound striking the ear-drum excites the sound-sensitive nerves of our ears. Electrical excitation is produced in the smell-sensitive nerves due to their contact with particles entering the nasal cavity. Similar is the case with the nerves of the tongue and the skin due to contact of objects with them.

These excitations produced in the terminal nerves on the outer sides of the sense organs ultimately reach the brain through the neural network of the body. Many scientific investigations have been done about the magnitude, frequency and mode of transmission of these signals. Several mathematical models have also been proposed for properly explaining their actions. But, from a purely scientific point of view, these nerve excitations of the body and brain are nothing but natural and mechanical actions-interactions of inert objects. Their only speciality is that in our waking and dream states these actions-interactions are found to be associated with our

knowledge of the objects and feelings of pleasure and pain. The confident march of science ends at this point.

Perception or knowledge is a fact, but claiming the existence of *real* external objects or that nerve excitations are its cause, is a faulty conclusion. It does not matter whether such a conclusion is arrived at by a scientist or by a commoner. The reason is, many things are seen and felt during dream, hallucination, hypnotism, and so on, but those things are all non-existent. Being themselves absent, they cannot be the causes of perception or knowledge. Such reasoning is called *absence-of-relation* (termed as *vyatireka*) in Indian logic. The great advantage of this kind of logic is that, for negating some cause-effect relation it is enough to demonstrate the 'effect' only once in the absence of the 'presumed cause'. Subsequent to this, all other thousands of demonstrations suggesting any probable cause-effect relation stand void. A very illustrative example is this: a serpent may be seen hundreds of times to come out of a hole just before sunrise, and still the serpent will not be the cause of sunrise, because sun's rising can be demonstrated even in the absence of that serpent or its coming out of the hole. Now it remains to be shown that nerve excitations are not the causes of perception. From a scientific point of view, such excitations or electric currents themselves are not knowledge, or pleasure, or pain. Had they been so, then simply by observing the nerve excitations of one person a second person could directly know the feelings of the former. Even any correlation or previous knowledge of what excitation means is unnecessary. Lots of currents flow in many electrical machines, electronic circuits, robots and computers. But they are not known to have any feeling like human beings. Then, why should we claim any knowledge or pleasure or pain associated with these excitations in case of human beings? We also know that an unmindful person does not perceive things in spite of the presence of nerve excitations. Such reasoning de-

mands the answer to be in the negative.

Experiences of clinical death or samadhi strengthen this point further. In these cases nerve excitations are found to be absent but not knowledge. Some people in such states are reported to have even felt their existence independent of their bodies. The body is then seen like an external object. Scientists and physicians have studied such events only recently; but Indian yogis are acquainted with samadhi experience, which is outwardly a lifeless state, since long.

Therefore the situation now stands like this: we cannot accept nerve excitations as the essential causes behind our feelings. At the same time, we cannot afford to totally ignore them because our perceptions are associated with them during waking and dream states. Consequently, we can only accept them as 'associated things'. Associated things are found to replace the actual cause in experiments on 'conditioned reflex'. In Pavlov's famous experiment on conditioned reflex, a bell used to be rung whenever food was served to a dog. As expected, the dog would salivate at the sight of food. The bell was known to have no role in this matter. It was just an associated thing. But, later on, it was observed that saliva secretion occurred merely at the sound of the bell. This event is similar to our perception process. Following this analogy, the salivation of the dog is analogous to our perception or knowledge: the 'sound of bell' to nerve excitations, and 'sight of food' to inner knowledge. In other words, the (inner) knowledge, conditioned by nerve excitations, is expressed as perception of objects/feelings. This explains our waking and dreaming experiences associated with nerve excitations, as well as experiences of clinical death and samadhi in the absence of those excitations. Notwithstanding the ability of this conclusion to explain the observations, it is contrary to common belief. But we have no other alternative than to accept it if we do not forgo rationality. Along with this conclusion it follows that an object is in essence a knowledge and the

whole world is nothing but the expression of a huge and complex knowledge. The objects and the world conceived otherwise are false. Interactions of components of this grand knowledge with one another may be illustrated through the block diagram given below:

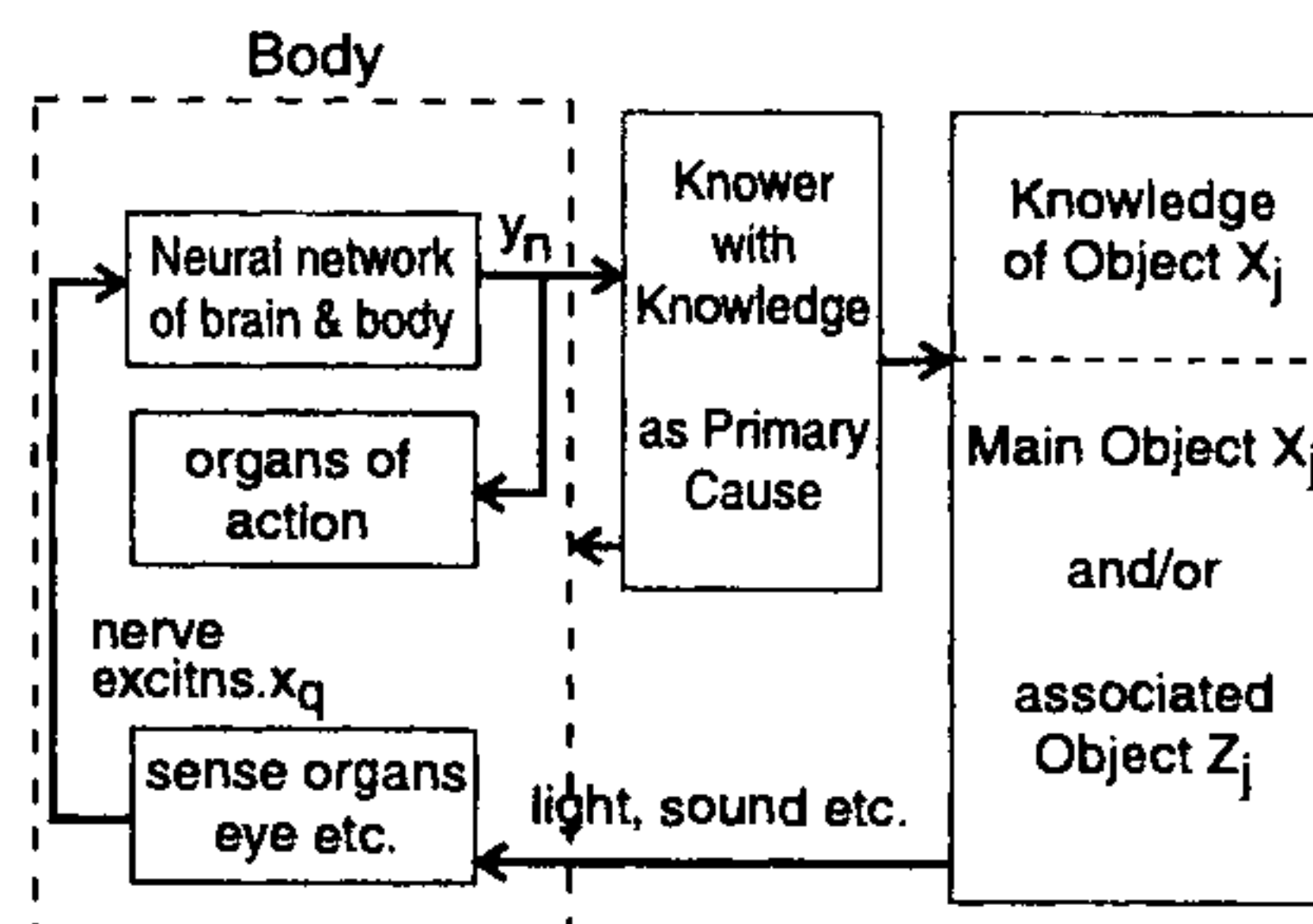


Fig. 1 Block diagram showing interactions of component-knowledge

This diagram shows that light, sound, etc, falling from different objects on the five sensory organs, produce some excitation signals, which finally travel to the brain after passing through the neural network of the body. Some other signals travel from the brain to the organs of action to effect their movements. All sensory responses of the body associated with knowledge/perception are presented to the knower. It is shown by the arrow from the left side towards the knower. The rightward arrow from the knower shows that the (inner) knowledge of the knower gets expressed as objects/feelings. The leftward arrow from the knower shows that another knowledge of the same knower gets expressed as the body. Similarly, some feelings go by the names of pleasure or pain, having no causal connection with other material objects except by some wishful thinking. Still, we believe that objects like money and other material objects are the direct or indirect sources of happiness. But through the application of the absence-of-relation logic, only one contrary example will

be sufficient to discard money (or other objects) as the direct cause, and another example to discard them as indirect causes of happiness.

Let us assume that a person gets information that a lottery ticket purchased by him has won a fabulous prize. He is very happy at that instant even without receiving any money. Had money been the source of happiness, then the person could not be happy before getting the money.

A doubt may still persist regarding money (or other things) as the indirect cause of happiness. This can be discarded by the second example—happiness of the deep sleep state. No specific knowledge or feeling of anything exists during deep sleep. 'I slept happily and did not know anything at that time.' This is the statement after waking up. There was no awareness of anything. So, the happiness of that state cannot be explained by anything received or heard or felt. Therefore, money or any other object or sensation or thought cannot be accepted as the direct or indirect cause of happiness.

The question arises: what is the source of happiness? The answer cannot be anything except the spontaneous manifestation of the inner happiness of the Self (of the nature of Existence-Consciousness-Bliss) in the absence of cloudiness caused by desires. In the first example, mere information about getting a prize quenches or extinguishes the earlier desire for the same. This happiness will not cease until the spontaneous expression is obstructed by cloudiness of new desires. The secret is that one invites unhappiness by desiring for objects and regains happiness only when the desire goes. In most of the situations desires are extinguished after the thing desired for is obtained. Thus, money or other things appear as the causes of happiness and we falsely identify them as direct or indirect causes of happiness. However, the actual cause is the absence of desires and the actual source of happiness is the Self. That is why sages and

scriptures advise us to give up desires.

Various approaches are found in scriptures for identifying the source of happiness. But the best and universal approach is the analysis of the three natural states: waking, dream and deep sleep states. From a common man's point of view deep sleep is an empty state. But the analysis of these three states are given special importance in Vedanta.

In his *Māṇḍūkya Kārikā* Gaudapada says (see second chapter):

None of the dream objects exist outside the dreamer's body as they are never visible to another person standing by his side. ... It is also not a fact that a dreamer goes out of his body and sees those objects elsewhere. Because it will not be possible for a dreamer to come back to his body on waking. So, the dream objects are false. ... No scripture or person has ever told that the dream objects are real. ... The dream objects cannot be accepted as being anywhere else except within the body in a subtle form. Similar is the case with waking objects. The phenomenon of the seer and the seen is similar in both cases. From a rational point of view there is no qualitative difference between dream and waking states. Wise men consider waking state as another dream. ... If something does not exist in the beginning and the end, it is false, though appearing to be true in the middle. This is the case with waking and dream objects. ... Often, objects of the waking state are claimed to be real because they satisfy our needs. For example, food: it quenches hunger. It is not so with dream food. The reason for this is, the food of the waking state is irrelevant in quenching the hunger of the dream state and vice versa. A person dreaming with a full belly may, in his dream, find himself to be hungry for several days, the food within the belly becoming irrelevant. So, objects of both the worlds are false.

For these reasons, Vedanta holds that objects and feelings of waking and dream

states are nothing but expressions of the self-effulgent Self. The same Self is also the seer. It is very strange that in the dream state we consider the objects and events seen as true, even as in the waking state the external world appears true; in fact, objects both in the dream and waking states are false.

The above idea has been stated in the second chapter of the *Yoga-vāsiṣṭha-sāra* in beautiful language: 'This universe originates from the Self and dissolves in the Self—like an earthen pot originating from earth and again merging into the earth, or like waves originating from water and again merging into it, or like an ear-ring originating from gold and again merging into it.'

All projections or expressions are absent in deep sleep. Stated differently, they remain dormant in a 'seed form in ignorance'. Nothing is felt in this state. But it does not imply that the knower had no consciousness at that time. A knower is a conscious being. So lack of consciousness of a knower is a contradiction in terms. According to Sankara, consciousness is that power because of whose existence one can say that nothing was seen in deep sleep. However, we do not experience any specific feeling in deep sleep. This signifies that the knower had nothing to know at that time. Such a thing becomes possible because of the unreality of the world. If the world was true, we would have felt its existence even in this state because of the continuous existence of consciousness. The *Viveka-cūḍāmaṇi* says: 'If the world was true, then one would have felt its existence even in deep sleep. It is unreal like a dream as it is not felt during that period.'

The world does not really exist. The question of desire for anything of a non-exis-

tent world becomes irrelevant. But an ignorance of the form 'I did not know anything,' exists in deep sleep. This gives the false impression that consciousness does not exist. The happiness of deep sleep is a consequence of the absence of desires. Similar is the case with other worldly happiness in the waking state due to temporary absence of any desire after getting a previously desired object. But none of the happiness of waking, dream or deep sleep is the unobstructed expression of the infinite Bliss inherent in the Self owing to the presence of ignorance. It is like the clouds obstructing the sun. All the yogas and austerities aim at the annihilation of this ignorance to enjoy the infinite happiness inherent in the Self.

Cessation of thoughts or desires is easier said than done. Desires will continue to exist so long as the objects of desire are considered true. On the contrary, the moment an object is known to be false or illusory, the desire for that object will vanish. Thereafter, dispassion and desirelessness become natural, effortless and permanent.

It is the tragedy of life that we neglect the analysis and significance of the three natural states and run after wealth etc hoping to find happiness in them. Eventually it turns out to be like trying to quench thirst with mirage-water. Without learning lessons from repeated failures, we continue our search for happiness along wrong lines. Vedanta tries to enlighten us like an affectionate mother in a variety of ways. Through effort, it assures, we all can realize that the world was ever non-existent but the Self, of the nature of consciousness, is the ever-existent reality, the source of happiness, peace and bliss. Thus, Self-realization brings fulfilment in life. □

Sorrows are God's Blessings

We shall have to count sorrows also as blessings from God, our Beloved. Unless a person is wholly resigned to God he cannot endure these sorrows and griefs undisturbed. It is very difficult for an average person to stand the actions and reactions of the world. A genuine devotee, because of his faith in God, is never overwhelmed by these.

—Swami Shivananda

Science During the Past Millennium: A Survey

PROF N. V. C. SWAMY

In our January 2000 number, we carried an article by Prof Jayant Narlikar on astronomy. Here, Prof N.V.C. Swamy gives an excellent and sweeping survey of the entire gamut of science during the last millennium. 'It has been a difficult job trying to decide what to include and what to exclude,' wrote Prof Swamy in his letter, and added, 'I have used the style adopted generally by scientists when they write about science for the general reader.' Prof Swamy was formerly director of IIT, Madras, one of the most prestigious institutions of India.

Introduction

Science, as we understand it today, is a product of the West. It had its origins in ancient Greece about 2500 years ago. Since then it progressed by fits and starts until the end of the seventeenth century, mainly because of the social and political upheavals in Europe during this period. From then onwards, there has been a spectacular growth, culminating in the explosive proliferation during the twentieth century, leading to the cliché that as many scientists are alive and working today as ever existed between the dawn of civilization and the end of the nineteenth century.

It is the intention of this essay to trace the growth and development of science during the last thousand years. The subject is indeed vast and would fill several volumes. However, what is being attempted here is to provide a bird's-eye view of the progress and the twists and turns which influenced this progress.

Today, science is studied under several disciplines, which are increasing day by day. However, historically it has been classified under three major branches—physical, chemical and biological sciences. Though this classification is no longer valid, still it will serve our purpose of a quick flashback at the last millennium. Moreover, the story of scientific growth can be narrated by dividing the last thousand years into the following peri-

ods: (a) from the onset of the Dark Ages to the advent of Newton; (b) the eighteenth century; (c) the nineteenth century; (d) the pre-War years of the nineteenth century; and (e) the post-War years up to now. This division is purely artificial and is made only for convenience, though scientific growth itself knows no artificial boundaries.

Science at the End of the First Millennium

To appreciate the strides made by science during the last millennium, it is but appropriate to know where exactly it stood at the beginning of that period. At that time, science in Europe was the hobby of the clergy. It had made no impact on the common run of the people, because education was confined to the clergy who lived in monasteries. The language of scientific communication was Latin. The demigod of science, whose word was authority and disagreement with whom had been declared anathema by the Church, was the great Aristotle. Original thinking was frowned upon, because Aristotle had said everything that could be said on science. The geocentric hypothesis ruled the roost in astronomy, with the earth the centre of the universe. The Ptolemaic hypothesis of epicycloids had been accepted to describe the trajectories of all planets and the sun around the earth, even though it led to absurdities. Mathematics had not yet developed enough to become the vehicle of scientific informa-

tion. Medical science, especially anatomy and physiology, was based upon the extensive work of Galen of the second century AD. Islam had come into existence and was trying to extend its region of influence both towards the East and the West. Chinese and Indian science had just then become accessible to Europe through Arab travellers to the East, though science itself had almost come to a standstill in these two countries.

It is against this background that one has to study the growth of science during the last millennium, which we will proceed to do now.

The Scientific Revolution

Why did the Christian Church cling so tenaciously to the geocentric hypothesis? One reason is that living on this planet, it is difficult for us to imagine that it could be rotating on its own axis! But a theological reason is that according to the Bible, God created man in His own image, man inhabits the earth and so the earth *has* to be the centre of the universe. Hence, questioning the geocentric hypothesis is tantamount to questioning the Book of God! Science is only a handmaiden to theology, which is an authority not only on scriptural matters but also on secular issues. It is the reaction to this dogma that led to the split in the Church and the liberation of science from the clutches of the clergy.

The first rumblings were heard, of course, in the field of astronomy, with the publication of a book by a Polish astronomer, Nicolaus Copernicus (1473-1543), called *De Revolutionibus*, just before his death. It suggested the alternative hypothesis of the heliocentric universe, with the sun at the centre. Copernicus escaped the wrath of the Church because he died the same year his book came out. Not so fortunate was Giordano Bruno (1548-1600), a Dominican friar of Naples, Italy. He was not really a scientist in the accepted sense of the term, but was rather a radical thinker and mystic, with ideas which appeared strange and heretical. He was burnt at the stake in 1600 for his transgressions.

The turning point in astronomy was, however, ushered in by Tycho Brahe (1546-1601) of Denmark, who for his period was a remarkable observational astronomer. In 1577, he set up an observatory on the Island of Hven in the strait between Denmark and Sweden, where he painstakingly collected a vast amount of data, even without the help of a telescope. Due to failing eyesight in his later years, he needed the help of an assistant and took on Johannes Kepler (1571-1630) for the job in 1599.

Kepler and Brahe never got along well with each other, though both needed the help of the other. Their relationship, however, was shortlived, because Brahe died in 1601 and Kepler inherited his vast fund of observations. Unlike Brahe, Kepler knew how to analyse the data and consequently made sense of the mass of information to come up with his three laws of planetary motion. The first two laws were published in 1609 and the third in 1619. Kepler thus set the stage for the arrival of two of the greatest figures of that period, Galileo Galilei (1564-1642) and Issac Newton (1642-1727).

The story of Galileo's brush with the Catholic Church is too well-known for us to recount here. More importantly, it was he who established experimental science on a firm foundation. He evolved the concept of controlled experiments to understand the nature of terrestrial mechanics, ie, motion of objects on the surface of the earth. He is also credited with the enunciation of the principle of inertia, which was taken over by Newton in his first law.

Newton was a worthy successor to Galileo, having been born within a few months of the latter's death. He was a great synthesizer, the first one in fact, in the field of science. It was his genius which spotted in the laws of Kepler and Galileo a common thread, and hanging on to that, he was able to come up with his three famous laws. Newton is justifiably remembered today for these laws as one of the greatest scientists of all time. But

there was something greater that he did—he gave a firm foundation to an earlier concept called the ‘scientific method’, first enunciated by Francis Bacon (1561-1626) in 1620. It is this method which is used even today in scientific research.

Newton’s discovery of the differential and integral calculus, and his enunciation of the laws of motion in terms of differential equations heralded the era of mathematical physics. Mathematics received a big boost, because it became the language of science. Newton’s equations display time-symmetry and also are deterministic in character. These two characteristics, combined with the concept of reductionism, in which a physical problem is reduced to simpler components, dominated science for the next two centuries, until they were challenged by thermodynamics. We will deal with this later.

What about chemical and biological sciences during this period? They were mostly in the background. Chemistry was still in its primitive form of alchemy, whose achievements were summed up in 1597 by the German alchemist Andreas Liebau in his book *Alchemia*. Biological sciences were in an even more undeveloped stage. The available knowledge had been documented by Vesalius in 1543. Only towards the end of the seventeenth century does one come across the very first steps towards a breakthrough, eg, the discovery of blood circulation by William Harvey in 1628, the discovery of the red blood corpuscle in 1658 by Jan Swammerdam, the experiments of Leeuwenhoek in 1676, leading to the discovery of living micro-organisms in dirty water, his observations on bacteria in 1683, etc. As an independent discipline, biology came into its own only in the eighteenth century.

The Eighteenth Century

The worldview of Newton was mechanical, deterministic, observable and understandable in terms of mathematical laws. But a proper application of these laws to practical situations demanded mathematical tools.

This was the task taken up by a host of front-ranking mathematicians in this century. The foremost among them was Pierre Simone de Laplace (1749-1827), whose contributions to mathematics are indeed phenomenal. He wrote a book on celestial mechanics and presented a copy to Napoleon Bonaparte. The latter, after browsing through the book, is supposed to have remarked, ‘Your book contains a lot about creation but hardly talks of the Creator!’ Laplace answered, ‘Your Majesty, I can do without that hypothesis!’

What is the significance of this remark of Laplace? Until his time, almost all important scientists had expressed the view that they were trying to unravel the mysteries of God’s creation. This may partly have been due to the fear of the Church and the memory of what happened to Galileo. But, by the time of Laplace, the Church had almost completely lost its stranglehold on science. This must have emboldened Laplace to make a clean break with the dogma of the Church. But there is also a deeper significance. The universe was looked upon as a mere clockwork mechanism, which had been wound up and left to tick merrily away. All one needed to know were the laws which governed this ticking and these were Newton’s laws. Laplace was so confident of the power and range of these laws that he declared, ‘An intelligence that, at a given instant, was acquainted with all the forces by which nature is animated and with the state of bodies of which it is composed would—if it were vast enough to submit the data to analysis—embrace in the same formula the movements of the lightest atoms; nothing would be uncertain to such an intelligence, and the future, like the past, would be present to its eyes.’

The supreme confidence with which Laplace made this remark was partly due to the scientific climate in Europe at that time. Most of the countries of Europe had by that time established colonies in the West in the Americas and in the East in India. Cheap raw materials had become available to manufac-

turers. Manufacturing and communication had become feasible by the invention of the steam engine by James Watt in 1769, its perfection in 1781 and its application to a locomotive in 1784. There was a sense of prosperity and euphoria, and society, at least its upper crust, felt itself on top of the world. Static electricity had been discovered and the Leyden jar had been invented in 1746. Benjamin Franklin's almost suicidal experiment with kites had been done in 1751. With so many things happening so rapidly, it is no wonder that science thought it had the answers to all questions!

This century, however, really belonged to chemistry. It came into its own as a discipline. There were two reasons why it took so long for this subject to emerge. The mother of chemistry, alchemy, was considered too esoteric and hence was kept a secret. Also, alchemists did not command the respect of society, being considered as cooks fiddling around with witches' broths. Of course, there was a lot of curiosity about the nature of gases and their combustion. Serious chemists, however, were misled to a wrong start by the theory of phlogiston, a fluid that was released or lost by any substance that burned or oxidized. It was not until the time of Lavoisier (1743-94) that the phlogiston theory could be laid at rest. But before that a few important developments had taken place.

Carbon dioxide was discovered by Joseph Black in 1756, followed by the establishment of the quantitative method of analysis. Black was followed by another famous but highly eccentric figure, Henry Cavendish, who is credited with the discovery of hydrogen in 1766. He also demonstrated in 1784 that when hydrogen was burned in air, water was produced. This was sensational news, because according to Aristotle, water was one of the four indivisible elements along with fire, air and earth. With his result, Cavendish drove the last nail into the coffin of Aristotelian world, which would never raise its head again.

Cavendish was followed by Joseph Priestley (1733-1804), who was a prolific writer, having authored about 150 books. His discoveries include ammonia, sulphur dioxide, carbon monoxide, hydrogen chloride and most importantly, oxygen. But the most charismatic personality was Antoine Laurent Lavoisier who was instrumental in introducing sound methodology, empiricism and a quantitative approach. He also introduced a new terminology for naming chemical substances reflecting the elements they contain. This is followed even today. He is thus justifiably called the father of modern chemistry. He was unfortunately a victim of the Reign of Terror in France and was guillotined in 1794.

A worthy successor to all these great chemists was John Dalton (1766-1844) who propounded his atomic theory in 1803. This, as we know, changed the entire course of the history of science, which we will examine later.

In the field of biological sciences, the most famous figure was Carolus Linnaeus (1707-78) who is the founder of the science of taxonomy, ie, the system of naming and classifying biological species. He is supposed to have identified 4200 species of animals and 7700 species of plants! He did not believe in the theory of evolution, maintaining that all species had a common origin. Ironically, it was to verify this that Darwin made his voyage, which resulted in proving the exact opposite! The other discoveries of this period were rather preliminary, like the role of oxygen in respiration, the development of organs and limbs from embryos, etc.

The eighteenth century was thus a period in which branches of science other than physics came into their own. The main motivating factor was the invention of the microscope. This has always been the pattern of scientific development. Physics leads to better instrumentation which in turn helps the other branches of science to grow.

The Nineteenth Century

We have already seen how the Newto-

nian worldview aided by the Industrial Revolution ushered in an era of prosperity and euphoria in the West. But very shortly this worldview was to receive jolts in the form of thermodynamics and electromagnetism, which asked questions for which Newtonian mechanics had no answer.

The Industrial Revolution was mainly the consequence of the invention of the steam engine. Coal was needed to power these engines and coal had to be mined at great expense. Hence arose the need to design the engines for highest efficiency, which required a deeper knowledge of the nature of heat. The first step in this direction had been taken by Jean Baptiste Joseph Fourier (1768-1830) in 1822. But the real breakthrough came through the seminal work of James Prescott Joule (1818-89), who showed in 1847 the close relationship between heat and mechanical work, leading to the first law of thermodynamics. This was followed by the work of Nicolas Leonard Sadi Carnot (1796-1832) and Rudolf Clausius (1822-88), who showed through their second law of thermodynamics that there is an upper practical limit to the efficiency of engines.

The second law of thermodynamics, which is expressed in terms of the concept of entropy, has been the most discussed and debated law of physics. Is it a fundamental law of nature? Some say yes, but others consider it only a statistical law. But it raises questions which need serious answers. Newton says time is symmetric in his equations, ie, they can not only predict the future, but also retrodict the past. Why, then, are we so conscious of the passage of time in one direction? The second law says that time always proceeds in the direction of increasing entropy. It fixes an 'arrow of time.' Thus it questions the very basis of Newton's laws and raises metaphysical issues about the very nature of time, which have not been resolved even today.

Around the same time, another discipline had been making its presence felt, viz,

electricity and magnetism. It had its origins in the sixteenth century itself, in the work of William Gilbert (1544-1603), but found its highpoint through the extraordinary contributions of Michael Faraday (1791-1867). Faraday's life is a fascinating story of the triumph of human will over adversities. He is one of the greatest experimenters of all time. He is credited with many inventions and discoveries, the most notable being the principle of magnetic induction leading to the electric motor, generator and transformer. He had two worthy successors in Thomas Alva Edison (1847-1931) and James Clerk Maxwell (1831-79).

Maxwell's grand synthesis of the electromagnetic theory was published in 1873. It was a brilliant piece of work by any standards. He showed that the interaction between an electric and a magnetic field propagates like a wave with a speed of 300,000 km/sec, which also happens to be the speed of light. Thus light was shown to be nothing but electromagnetic waves of a certain range. The existence of these waves were very shortly verified in 1888 by Heinrich Rudolf Hertz (1857-94).

Physics at the end of the nineteenth century was ripe for a revolution. Many loose ends had been tied together, but many more were hanging about. Many questions had been answered, but more had been raised. The grand synthesis had to wait for the turn of the century and came about through the quantum hypothesis of 1900 and the relativity theories of 1905 and 1915.

Chemists had been puzzled for quite some time as to why elements tend to combine to form compounds in integral proportions and the answer was provided by Dalton. This led to a race for the discovery of new elements, which was spurred on by the Periodic Table of Dimitri Mendelyev (1834-1907) published in 1869. Very soon, the importance of carbon as a major component of life was recognized, leading to the birth of organic chemistry. This provided a link between chemical and life sciences and paved the way

for the advent of microbiology and genetics in the twentieth century.

The nineteenth century was witness to another remarkable revolution in life sciences, heralded by Charles Darwin (1809-82) and Alfred Russell Wallace (1823-1913). This is the famous theory of evolution. The impact of this theory on western society was shattering. People just could not stomach the fact that they had descended from the apes! Darwin was lampooned as a gorilla in many newspaper cartoons. Even people like Bernard Shaw and H.G. Wells opposed him. His staunchest supporter was Thomas Huxley who defended this theory stoutly. Today, of course, this theory is accepted, except for the concept of 'survival of the fittest', which has been questioned by many psychologists and psychiatrists.

Not so spectacular, but equally important were the experiments of Ivan Pavlov (1849-1936) on automatic reflexes and animal behaviour, the birth of the cell theory, the great experiments of Louis Pasteur (1822-95) and the concept of the origin of diseases through germs as established by Robert Koch (1843-1910). Perhaps not so well acknowledged were the experiments of Jagadish Chandra Bose (1858-1937) on the manifestation of consciousness in plant life. These were only precursors to the spectacular advances to which we will turn our attention.

The Pre-War Years of the Twentieth Century

This pre-War period is aptly described as the golden age of physics. It started with the discovery of X-rays by Wilhelm Conrad Roentgen (1845-1923) in 1895, of radioactivity by Antoine Henri Becquerel (1852-1908) in 1896, of plutonium and radium by Marie Curie (1867-1934) in 1898 and of the electron by Joseph John Thomson (1856-1940) in 1897. These discoveries questioned one of the axioms of science, viz, indivisibility of the atom. The atom after all is divisible and consists of smaller components. The race was then on to find them. The nucleus was discovered by Ernest Rutherford (1871-1937)

in 1911, who also postulated the solar system model of the atom, as a set of negatively charged electrons orbiting around a positively charged nucleus. But according to Newtonian mechanics, such a system should be unstable, the electrons orbiting towards the nucleus and settling on it. This was not the case and the atom was very highly stable. Why? The answer was provided by the quantum hypothesis.

The theory of the quantum owes its origin to Max Planck (1858-1947). In a seminal work published in 1900, he explained the continuous spectrum of black-body radiation by stating that energy is absorbed or radiated by bodies in discrete packets called quanta. The idea was initially received with scepticism, but very soon was confirmed by Albert Einstein (1879-1955) in 1905, who could provide an explanation for the puzzling photoelectric effect with the help of this hypothesis. This spurred on Niels Bohr (1885-1962) of Denmark to investigate whether this new hypothesis could also explain why the atom was so stable. This he did in 1913 through his model of the atom, in which the electrons were confined to specific orbits and jumped between them while absorbing or radiating energy.

Meanwhile, Einstein's explanation of the photoelectric effect through photons, the fundamental particles of light, revived an old controversy about the nature of light: wave or particle. Newton had said that light was a particle, but his contemporary Christian Huyghens (1629-95) had disagreed. The double-slit experiments of Thomas Young (1773-1823) appeared to have settled the issue in favour of the wave-nature of light. This had been confirmed by Maxwell by showing that light is an electromagnetic wave. But here comes Einstein with his explanation of the photoelectric effect which demands that light behave like a particle. So who is right? This controversy raged for quite a while. It is now generally accepted that electromagnetic radiation behaves like a wave at low energies

and like a particle at high energies, with light displaying both characteristics.

The electron is certainly a particle. But, like light, can it also behave like a wave? This was the question asked by Louis de Broglie (1892-1987) who worked out the details mathematically as to how electrons would behave if they were waves. This work was published in 1923 and found its experimental verification in 1927. It opened up a Pandora's box of dichotomies, with which physics is grappling even today.

Werner Heisenberg (1901-76) meanwhile tried to rework the results of de Broglie through a different mathematical technique and came up with his famous uncertainty principle in 1927, which is still playing a decisive role in physics. At the same time, another approach adopted by Erwin Schroedinger (1887-1961) led him in 1926 to the formulation of his famous equation, which has become the corner-stone of modern quantum mechanics.

A parallel and equally spectacular development of this period was the theory of relativity. Several attempts had been made towards the end of the nineteenth century to analyse critically the fundamental nature of Newton's and Maxwell's laws, either to play them one against the other or to amalgamate them. It was, however, left to Einstein to place both of them in their proper perspectives and to amalgamate them through his special theory of relativity in 1905. He followed it up in 1915 with his general theory of relativity, which synthesized the concept of acceleration and gravitation through a new four-dimensional gravitational theory. This theory again did not have to wait long for confirmation. It was in 1919 that one of its predictions, viz, that light bends in a gravitational field, was confirmed. Since then, this theory has become the foundation for modern cosmology.

The quantum and relativity theories have proved to be extremely fruitful in their practical applications, especially the former; but they have also raised certain metaphysi-

cal issues. Quantum mechanics through its wave-particle duality questions the very nature of matter. The uncertainty principle appears to place a limit on sensory knowledge, independent of scientific paradigms. The probabilistic nature of Schroedinger's equation questions the very basis of determinism. The speed of light as the upper limit for transmission of signals casts doubt on the existence of simultaneity. The time-symmetry of both these theories has clashed with the second law of thermodynamics, and the debate is still going on about the nature of space and time.

Quantum mechanics was so overwhelmingly dominant in its role that it influenced even chemistry, with the result that inorganic chemistry for all practical purposes has got absorbed into it. Organic chemistry, on the other hand, started gradually merging with biological and life sciences, giving rise to the disciplines of biochemistry and microbiology. The dividing line between these and medical sciences also became thin, so that they can hardly be distinguished from one another. The discovery of wonder drugs like penicillin, sulfa and insulin was the work of chemists, but found their application in medicine. At the same time, the earlier experiments of Gregor Johann Mendel (1822-84) served as a fillip to further research on genes and heredity. But the real breakthroughs in these fields came only after the Second World War, the period to which we now turn our attention.

The Post-War Period of the Twentieth Century

It is almost impossible in an article of this nature to summarize the spectacular achievements of science, and its daughter technology, during the last few decades of the last century and millennium. Also, we are too close to the picture to be able to develop an objective attitude to whatever has happened recently. But, it is indeed an irony that these achievements have been the fallout of the most devastating war of human history, viz the Second World War.

Two scientific developments of the War

period have profoundly influenced humanity—the splitting of the atomic nucleus and the invention of the rocket. Even though these developments were pretty modest during the War, and would have remained so even after the War, they received an enormous boost because of the so-called Cold War between the western powers and the Soviet Union. The splitting of the nucleus on the one hand led to the atomic bomb, whose awesome power was displayed towards the end of the War itself, in Hiroshima and Nagasaki. On the other hand, it also led to fundamental research on sub-nuclear particles and their components called quarks.

Until the Second World War, relativity and quantum mechanics developed as independent disciplines, with the exception of the epoch-making work of Paul Adrian Maurice Dirac (1902-1984), who successfully amalgamated them, leading to the discovery of anti-matter in the form of positron (positive electron) and the birth of quantum electrodynamics. This new discipline, QED as it is more popularly known, became the medium to understand sub-atomic physics. At the same time, it also helped in the attempts to bring together the four basic forces of nature—gravitational, electromagnetic, weak (leading to radioactive decay) and strong (sub-nuclear) forces. As of now, the electromagnetic and weak forces have been amalgamated into the electro-weak force and attempts are on to graft the strong force also. The dream of incorporating gravity is still far from being realized, though the recent string and superstring theories are trying to do so. The picture is still hazy and may take some more time to clear.

The other development, viz rocket technology, led in the post-War years to space science as well as to the space-race between USA and the former USSR. Manned explorations to the moon and unmanned explorations to the nearby planets have provided a wealth of information about the nearby regions of the solar system, but more distant

voyages of the *Star Trek* type are still far away in the future.

All these developments were made possible by two technological innovations—telecommunication and the computer. We have just entered this stage and it is still too early to say how long the impact of these two revolutions will last. The new millennium is already being projected as the age of information! Humanity is already reeling under the impact of an avalanche of information and it should not come as a surprise if the reaction sets in soon.

The field of life sciences has at last come into its own in this period, with the advent of molecular biology and genetic engineering. The achievements here have also been spectacular, but at the same time frightening. Cloning of species has become a reality. The line dividing fact from fiction is becoming ever thinner. Medical science has also reached great heights in its achievements, but has been humbled by the proliferation of new diseases like cancer and AIDS. Both are being attributed to a change in lifestyle, brought about by too rapid a growth in technology, leading to environmental pollution, ecological disasters, and reckless mishandling of genes. One wonders sometimes if all these superfast achievements are really taking us towards an El Dorado or to a black hole! Only time can tell.

Before closing this essay, we wish to refer to one aspect of physics, which has attracted the attention of at least a small number of scientists, psychologists and biologists. This is the role of consciousness in quantum phenomena. The ball was set rolling in 1955, by Johan van Neumann, who said that all quantum phenomena are a set of waves of possibilities, unless they are observed, when they collapse into reality. He went on to declare that it is consciousness in the form of the observer which collapses these possibilities into realities. Thus the observer becomes a participator in a quantum measurement. Those scientists who agree with van Neu-

mann have found parallels in Vedanta and Buddhism, a trend started by Fritjof Capra in his book *The Tao of Physics*. But there is an equally strong group of scientists who believe that it is too early for science to surrender to mysticism. So the debate rolls on, with both sides holding on strongly to their views. Readers interested in this debate and related issues are referred to a recent book, *Doubt and Certainty* by Tony Rothman and George Sudarshan (Perseus Books, 1998).

Where are we Headed?

What does the future hold for science and also for us? Nobody in his or her right mind would venture to answer! But one thing is certain. Science has never had to face so many moral and ethical issues as at the present time. There are powerful anti-science

lobbies building up, which demand that technological process must be halted and that we should go back to nature. Many people have started looking to the East for a solution to these issues, and some others are seeking them in the ancient shamanic traditions of the native Americans. The New Age literature, as it is popularly called, is full of predictions, prophecies and recipes for a troubled world.

One thing, however, is certain. If humanity has to survive, it has to take its eyes away from the dazzling display of technology and direct them towards these moral and ethical issues and face them boldly. This is probably what the next millennium demands of us, if we have to last through the next thousand years. □

Young Students Should Read This

William Cobbett's account of how he learnt English grammar is full of interest and instruction for all students labouring under difficulties. 'I learned grammar,' said he, 'when I was a private soldier on the pay of sixpence a day. The edge of my berth, or that of my guard-bed, was my seat to study in; my knapsack was my book-case; a bit of board lying on my lap was my writing-table; and the task did not demand anything like a year of my life. I had no money to purchase candle or oil; in winter time it was rarely that I could get any evening light but that of the fire, and only my turn even of that. And if I, under such circumstances, and without parent or friend to advise or encourage me, accomplished this undertaking, what excuse can there be for any youth, however poor, however pressed with business, or however circumstanced as to room or other conveniences? To buy a pen or a sheet of paper I was compelled to forgo some portion of food, though in a state of half-starvation: I had no moment of time that I could call my own; and I had to read and write amidst the talking, laughing, singing, whistling and brawling of at least half a score of the most thoughtless of men, and that too in the hours of their freedom from all control. Think not lightly of the farthing that I had to give, now and then, for ink, pen or paper! That farthing was, alas, a great sum to me! I had great health and great exercise. The whole of the money, not to be expended at the market, was twopence a week for each man. I remember, and well I may, that on one occasion I, after all necessary expenses, had on a Friday, made shifts to have a halfpenny in reserve, which I had destined for the purchase of a red herring in the morning; but, when I pulled off my clothes at night, so hungry then as to be hardly able to endure life, I found that I had lost my halfpenny! I buried my head under the miserable sheet and rug, and cried like a child. And again I say, if I, under circumstances like these, could encounter and overcome them, is there, can there be, in the whole world, a youth to find an excuse for non-performance?'

—retold from Samuel Smile's *Self-Help*

RELIGION AND LIFE

Swami Bhuteshanandaji's Answers to Questions

The questions and answers being serialized in these columns are not meant to be scholarly expositions of various issues. People from different walks of life used to meet Swami Bhuteshanandaji Maharaj daily during his tenure as President of the Ramakrishna Order, and discuss with him their problems and doubts; and Revered Maharaj would clear their doubts in a characteristically simple way. These questions and answers were recorded and read out to him before he approved them all for publication.

Maharaj, how to know the right path?

Pray to God. If you pray sincerely, He will listen. And when the prayer is from the depths of your heart, He will fulfil it. Do not worry about the past; what you have left behind is not worth considering at all. There is the Lord in the future.

What is meant by the state of inwardness (antarmukha)?

You turn towards the east to look eastward; similarly when you turn towards internal things—questioning yourself, searching for the inner Reality, concentrating on God within—you are an *antarmukhī*. God alone is everything. By constantly thinking of Him we can become immortal. The Upanishads say that the Creator has made all our senses outgoing. Only a person of knowledge will control them and turn their direction inward and will see Him.

How do we know if we are making spiritual progress?

This is a pertinent question. We are praying to God, practising japa and meditation. But have we made any progress? It is natural for such questions to come to mind. Now, whether or not we are able to gauge our progress, it is sufficient that we are thinking of God. This itself is its reward. We must know that fulfilment in life comes by repeating God's name.

The vital point is, we should be ready to pay the price that is due. If you want to buy something, you must pay the price. If it is

some vegetables you may pay less, but if it is golden ornament you must pay more. In order to obtain God, you should be ready to pay the highest price. You cannot obtain Him for any bargain—any reduction in price. *Śrīmad Bhāgavata* (11.2.42) says:

Bhaktiḥ pareśānubhavo viraktir-

anyatra caiṣa trika eka-kālah;

Prapadyamānasya yathāśnataḥ syus-

tuṣṭiḥ puṣṭiḥ kṣudapāyo'nughāsām.

A hungry individual has several difficulties: the pain of hunger, mental agony at not having had anything to eat, physical weakness, etc. When he gets food, with each morsel he is being freed from the pain of hunger, he gets rid of his mental agony, and also regains physical strength. Just as all the three things occur simultaneously to a hungry person when he eats food, a person surrendering himself to God will attain the following all at a time: his devotion to God increases, he gains clearer understanding of God and the world, and grows apathy towards worldly attractions. As the attraction for God increases, worldly attractions diminish. If worldly attachments do not decrease, know for certain that the so-called devotion is false. The 'devotee' who displays his prayer-prowess in the temple but remains steeped in worldliness has no genuine devotion. Had his attraction to God been true he would not be hankering for material enjoyments. The vast majority of people remain wholly preoccupied with the world and cannot spare even a few minutes

for God. This class is not considered as the devotee class at all. There are some others who have frequent 'visions' of God, 'visitations', etc. Many ask us whether these visions are true. In reply, we can say this: 'Have worldly attractions lessened in you? If that has not happened, all your visions are untrue.' The closer our mind gets to God, the clearer our conception of Him. Then what is seen in visions will be genuine; otherwise visions are mere fantasies. You hear people say, 'When I sit down for meditation I hear Sri Krishna's flute,' 'I see Mother Kali standing in front of me,' 'I see Lord Shiva,' etc. Now such people are deluded by hallucinations. If their attachment to the world does not show any reduction, then all these visions are not only imaginations of the fertile brain but also self-deception. Sri Ramakrishna says that as you go towards the east, the west is left more and more behind. The more we progress Godward, the lesser our household attractions. The main thing is reduction of worldly attractions. We should always be cautious to see if the world is still too much in us. The journey is long and to progress in the spiritual path will take time; discrimination itself will take much of our time. In her long wait for Sri Rama, Shabari's childhood went by, youth went by, old age crept in; when she was almost at the fag end of her life she was favoured with the vision of Rama. But that was enough: having the vision of the Lord just for once will bring fulfilment in life.

Sage Narada was a devotee. He left home at the tender age of five and started walking towards the north. Having travelled very far, tired and weary, he reached a huge forest. There, in the loneliness of the forest, he sat under a huge banyan tree and began meditating on God. After days of struggle, he finally had the vision of God.

*Dhyāyataś-caraṇāmbhojaṁ
bhāva-nirjita-cetasā;
Autkanṭhyāśrukalāksasya
hṛdayāsīnme śanairhariḥ.*

[Bhāgavata, 1.6.17]

That was the only time Narada had the vision of God. While longing to see God again, he heard this divine message: '*Hantāsmiṁ janmani bhavānna mām draṣṭumihārhati*, Narada, you will not see me again in this birth. But the one vision which you have already had will bring fulfilment to you. Go on repeating His name in this universe, and thus will you attain perfection.'

By thinking constantly of God, we can become as holy, pure, and virtuous as God. Fulfilment comes slowly in the aspirant's life. It is not that it comes in just one lifetime; it may require many births; but our effort should be to achieve perfection in this very life itself. The *Gītā* [7.19] says:

*Bahūnām janmanām ante
jñānavān mām prapadyate;
Vāsudevaḥ sarvaṁ iti
sa mahātmā sudurlabhaḥ.*

A *jñāni* is very dear to God because it is very rare indeed to find a person who after sadhana for many lives worships God with the certain realization that everything in this universe is God. Such a saint is hard to find.

Maharaj, how are we to attain His mercy?

You will have to 'unfurl the sail' to obtain His mercy.

What is the meaning of 'unfurling the sail'?

If a boatman unfurls the sail when a favourable wind is blowing, he can move faster. You must long for His mercy. To 'unfurl the sail' means to pray to God with intense longing for His mercy.

They say that nothing happens without God's grace. In that case, are our endeavours too dependent upon His grace?

That we intend to make efforts to know God is due to His grace all right. But so long as our sense of doership doesn't go, we shall have to make sincere efforts to realize Him. Thereafter, the bestowal of His grace depends on His sweet will.

—compiled by Smt Manju Nandi Mazumdar

Concept of Existence in Advaita Vedanta

SWAMI TATTWAVIDANANDA

Swami Tattwavidanandaji teaches novices at the Probationers' Training Centre, Belur Math. In this article, he presents a fresh look at the Advaitin's views on existence by comparing it with the others. Sri Sankara Jayanti will be celebrated on the 8th of this month.

Diversity, disharmony, strife and struggle mark the universe we live in. The universe though called cosmos appears to be a chaos. No two minds are alike. Our innate ideas, preconceptions, mental proclivities and impressions exercise such a great influence upon us that very often we are compelled to accept many things that do not stand the test of logical reasoning. Again, through logical reasoning and experience we develop many views and opinions. These views are different in different people and their interpretations also are not the same. This is true of both commoners as well as pundits. The *Mahābhārata* says humourously, 'Nāsau muniryasya matam na bhinnam, he is no sage who cannot hold a view which is entirely different from others.'

Despite differences, there are a few things which are universally accepted by all. Of them what is of prime importance is existence. Existence is the essential precondition of our life and activities. In fact, Indian philosophers have divergent opinions about what existence is, but no one has ever rejected it altogether. Now, before we deal with the concept of existence according to the non-dualistic school of Vedanta, or Advaita Vedanta, we

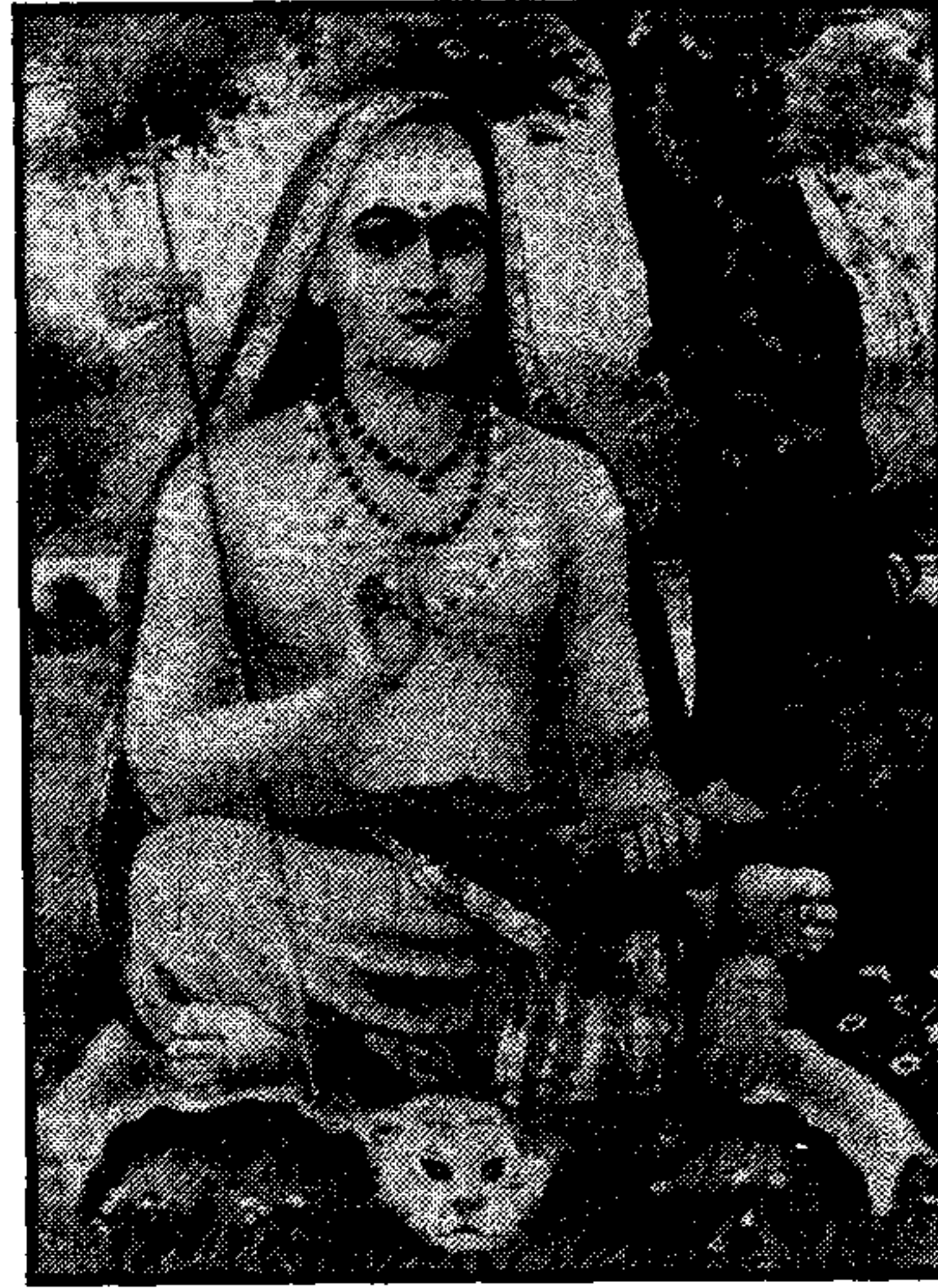
would like to mention in brief the views held by some other schools.

Existence in Various Schools

The Sanskrit word for existence is *sat* or *sattā* which is derived from the verbal root *as*, meaning 'to be'. According to the Naiyāyikas and Vaiśeṣikas *sattā* is the widest universal, or

parā jāti. It is present in substance, attribute and action in the relation of inherence, or *samavāya*. One of the many categories, or *padārthas*, admitted by the two schools is universal, or *jāti*. A *jāti* is something which is everlasting and present in all the members of a class. For example, cowness is invariably present in all cows. The universal called

cowness is rather limited in scope as it is found only among the animals called cows. So with clothness, potness, etc. They are insular or less extensive compared to *sattā jāti* which is uniformly present in all substances, attributes and actions. The perception of existence (isness) with respect to existing things is nothing more than that of things themselves. As for example, in the statement 'a pot exists', the existence referred to is nothing but the pot's; 'existence' and 'pot' refer to the same thing.



The Sāṃkhya and Pātañjala systems uphold two eternal principles, Puruṣa and Prakṛti. The word *sat* is used in the Sāṃkhya philosophy with reference to the theory of creation. Prakṛti being real, its evolutes are also real. Vācaspati Miśra observes in his commentary on the *Sāṃkhya Kārikā* that 'the effect is identical with the cause in essence; it pre-exists in the cause (*sataḥ sajjāyate*).' Production is nothing but a transition from an implicit to an explicit condition. In the same way, destruction means return to the potential or implicit state.

The Sautrāntika school of Buddhism has dealt with in detail the theory of momentariness. The Sautrāntikas uphold the inferiority of external objects and hence are called representationists. According to them, whatever is existent is momentary like a mass of clouds. Existence consists in practical efficiency or serving a purpose. This is found in everything, like the colour blue. Serving a practical purpose and momentariness constitute what is called existence.

Existence in Vedānta

After a brief account of what is denoted by existence in different systems of Indian philosophy, let us now turn to Advaita Vedānta to see the unique view it holds about existence. Existence in this philosophy is exactly what the term promises. Being strict adherents of the Upaniṣadic doctrines the non-dualists, or Advaitins, have formulated the concept of existence in that light. Following the Upaniṣadic texts the Advaitins have equated existence with the supreme Reality. In Upaniṣadic parlance the supreme Reality is Brahman and it is described as Existence Absolute. And being so, its non-existence under any condition is inconceivable. The Advaitins have therefore described absolute existence, or *sat*, as that which is uncontradicted. Non-contradiction is the essential mark of Reality. Reality is one, non-dual, un-qualified and indeterminate. It underlies the universe of diverse objects, which is an appearance. The universe is an appearance because it is chang-

ing and perishable and hence impermanent. The analogy of snake-rope illusion is a pointer to this. To a man under the spell of ignorance, an inert piece of rope may appear to be a dreadful live snake. The illusory snake is a fleeting object. When the rope that underlies it, and which alone is real, comes to sight, the apparent snake vanishes in a trice. Here, the snake is contradicted by the piece of rope, but the rope is uncontradicted because it is the substratum of the illusory snake. The substrata of illusions are always real. No illusion can take place upon something which is false. In that case, both being false one cannot be mistaken for another.

In the same way, the manifested universe marked by birth, change, destruction, etc is illusory. Being illusory it must be admitted that something permanent is its substratum and that should be ever uncontradicted. Brahman is that Reality. In this context we should keep in view that in the case of snake-rope illusion too the consciousness associated with the rope is the substratum of illusion and not the rope as such. Hence we see that Brahman has got to be absolute existence; otherwise the sublation of the universe which has a provisional entity would be impossible. Sublation is the apprehension of the absence of a thing upon a locus in all the three periods of time, past, present and future, where it was appearing as real. Something to which such a sublation does not pertain is Existence Absolute. Non-sublation does not pertain to things with phenomenal reality such as *ākāśa* and those of illusory reality such as silver on nacre. The empirical and illusory things have no permanent or unconditional existence since, with the rise of the knowledge of Brahman and the perception of nacre etc, they are sublated. Hence the essential feature of existence called non-sublation does not pertain to things which have phenomenal or illusory existence.

Advaitic Orders of Existence

In this context let us examine the three orders of existence held by some of the Ad-

vaitins. They are:

1. *Absolute existence.* This denotes non-contradiction in the three periods of time and the three states an individual passes through every day, viz, waking, dream and dreamless sleep. This may further suggest not getting associated with anything. Such absolute existence refers to Brahman alone, which is pure Consciousness.

2. *Empirical existence.* Non-contradiction of the world of experience which is marked by time, space and causality; such a world persists for a man who is yet to be illumined through intuitive experience of the ultimate Reality. Here, of course, contradiction and transcendence do not mean non-perception of the empirical universe but complete certitude of its falsity.

3. *Illusory existence.* It is non-contradiction under the spell of illusion. Illusory silver etc last as long as the illusion lasts. This may further be said to be a contradiction at the time of empirical dealings. A piece of illusory silver, though it appears for the time being, does not serve any practical purpose. Here it deserves mention that illusoriness or *prātibhāsikā* of something does not only mean its existence as long as it is perceived. In that case happiness, misery, etc too will be regarded as illusory since they do not endure beyond their perception. Hence illusoriness is described as that which is caused by some adventitious defect.

Ākāśa etc, which have an empirical reality, are born of *māyā*, which is the direct material cause of the universe and is associated with *Īśvara*. Illusory silver, snake, dream images, etc spring from *avidyā*, which resides in the individual self. But actually the word 'existence' cannot be ascribed to them without hampering the true spirit of the word. The true import of the word in question is non-contradiction. Both empirical and illusory objects are fleeting and changeable and contradicted when possible causes arise. Therefore, existence is attached to them in a secondary way. Worldly objects, though they appear to

be independent and self-certified, falsify themselves and are falsified by others. Take for example an earthen pot. Its outer form is not independent of its material cause, clay. Hence it is false. Further, it is restricted to a particular space, time and consciousness called waking. What is restricted to time, space, etc cannot be real. Moreover, our waking experience is contradicted by dream and dream images by dreamless sleep. In the same way, clay also suffers the same fate when it is looked upon as an effect.

The *Bhagavadgītā* (2.16) rightly observes: 'Of the unreal there is no being, of the real there is no non-being.' Gauḍapāda speaks in a similar vein: 'That which does not exist either in the beginning or in the end, exists not in the middle too.' False things may appear and disappear but the real never goes out of existence.

Brahman is Existence

Existence constitutes the very nature of Brahman. It is not an attribute of Brahman. Had it been an attribute, Brahman would have been the Reality with attributes, and something with attributes is never indeterminate. Here it may be contended that Brahman defies all description—how can the word 'existence' be used to denote It at all? To this the Advaitins reply that the description of Brahman as existence is actually with a view to giving an idea of Brahman in a negative way. Brahman is beyond the mind and senses. It is totally otherworldly. But we are conversant only with worldly things. Anything beyond the scope of the world hardly strikes us. Hence even to give an inkling of what is otherworldly we need to refer to the world. Existence is ascribed to Brahman just to express that it is quite opposite to the universe and does not hold any worldly features. Change, perishability and impermanence mark the world. But Brahman is quite distinct from them. And this is what existence, or *sat*, stands for.

We have observed that from the non-dualistic standpoint Brahman alone has exist-

ence proper and the world actually is an appearance. Here a question may rightly be asked: Is the world-appearance without any basis or being? Is it like a shadow without substance? To this the non-dualists reply in the negative. The world is really illusory but it is not without any being. For if that were not so, the non-dualistic view would be at par with nihilism, or *śūnyavāda*. There can be no false appearance without any substratum, a point we have already made.

The Aim of Advaita

Actually, the aim of non-dualistic Vedānta is not to point out the falsity of the universe, but to prove the Being or Reality underlying it. It deals with human emancipation, and emancipation consists not in knowing what is false but in knowing or intuitively experiencing what the ultimate Truth is. When That is known, the universe with its host of alluring objects can no longer tantalize us. The Reality being one It manifests in and through diversity and an illumined soul is not scared of it but may be engaged in its welfare.

The sense of existence is a constant factor in everything we perceive. We always feel we exist, the sun exists, the earth exists, the sky exists, and so on. Even in our expression of non-existence we predicate existence. In the Sanskrit word *nāsti* denoting absence or non-existence *asti* or 'isness' invariably figures. When we say 'there is nothing' expressing non-existence of anything, we tacitly acknowledge the presence of space which the word 'there' implies. In fact, every illusion is real to the man who experiences it under the spell of ignorance. Its falsity is revealed later. The Upaniṣad exhorts us to enquire into Brahman in order to know It and reach the goal of life thereby. No quest or inquiry is possible of something that is totally unknown or unintelligible. Changelessness is an essential feature of what is permanent. In all the cases of 'the earth exists', 'the sky exists', etc the existence is unchanged whereas the earth, sky, etc are changing. Observing the unchanging nature of existence we can well understand that it

refers to Brahman and thus we are always having a glimpse of It through the existence of worldly objects.

Here there is no room for any misconception that such existence, as pointing to the Reality, is mere abstraction or imagination with no touch of practicality. In the example 'a jar exists', the jar-ness and existence are not two distinct realities related to each other as in the case of 'a blue lotus'. In a blue lotus, blueness and the lotus are related to each other as attribute and substance. Blueness is present not only in the lotus but elsewhere too. Similarly, a lotus can be without blueness. This is not so with respect to jar-ness and existence. There can be existence without jar-ness as in potness etc, but there can be no jar-ness without reference to existence. These two are inseparable, though distinguishable. We have always two conceptions of a thing. One is about its being, the other is about its different aspects or features. Being is permanent while features are impermanent. When a jar is broken to pieces, only its particular shape or form is lost but not the being which inheres in it. The potsherds may further be reduced to powder but never to nothingness or void. Existence endures some way or other.

Now, this existence can alone be consciousness which can never be negated, as its negation implies existence of consciousness. In Advaita literature this has been pointed out with reference to different types of human experience, waking, dream, dreamless sleep and ecstatic. In these different states objects differ and these are negated in other states. But that which remains constant through all states is consciousness without which no experience is possible. In dreamless sleep there is an awareness of bliss, as when a man wakes up from slumber he speaks of his blissful experience where there was no disturbance. But this bliss is also associated with ignorance as it exists in its causal form even in that state. But that ignorance also is dispelled when a man reaches the transcendental state which is technically known as the ecstatic. Śaṅkara

himself, in his commentary on the *Māṇḍūkya Kārikā*, has distinguished between pure bliss and contaminated bliss in the states of ecstatic and dreamless sleep respectively. Thus, ultimately, existence, consciousness and bliss are non-different, but only expressed in different terms for different considerations. In Vedanta the search for Reality begins with the enquiry into the inner nature of man. The difference between subject and object or knower and known serves as the clue for such investigation.

It is generally believed that words have an expressive power, or *śakti*. A word may denote a particular thing or a class which it belongs to or an individual characterized by a universal. As for example, the word 'cow' may denote a particular cow or cowness or a particular cow characterized by cowness. Being a word, *sat* also must signify any one of the three alternatives. From the Advaitic standpoint such a contention is meaningless because *sat* refers to the Reality which is trans-empirical. The alternatives mentioned here about the meaning of a word refer to a thing having empirical validity alone.

If existence is interpreted as causal efficiency or causal relations, ie, the relation between a cause and an effect, it is to be accepted as real. But according to Advaita Vedanta an

effect does not exist independent of its cause as a pot is nothing but clay in essence. So essentially a pot apart from clay is non-existent. If clay alone exists, it cannot be accepted as a cause because a cause requires an effect which is non-existent. Thus ultimately there is no cause even. This is the reason why the Advaitins accept indeterminate Brahman as the only reality and this has no cause. In the *Māṇḍūkya Kārikā* this has been elaborated.

Some philosophers might have admitted the possibility of the unity of existence. But according to Advaita Vedanta this is impossible, as according to it unity implies difference as equally real. Advaita Vedanta holds that the One without a second is only real and the difference which appears is negated in the locus of that ultimate One.

This brief account of existence according to Advaita Vedanta invariably points to the uniqueness of the Vedantic worldview. The ultimate Reality is all-pervading and being pure Consciousness It is not restricted by anything. It exhorts us to broaden our horizons and rise above our puny individuality and limited views, realizing the Reality everywhere. The time-space-change-ridden world will then cease to trouble us anymore, and difference and disharmony will soon be a matter of the past. □

The Meaning of Vedanta

Some persons are of the wrong impression that the meditation and concentration of the Vedantic teaching lead gradually to self-hypnotism. Vedanta culture, on the other hand, saves one from self-hypnotism and self-deception. Vedanta is nothing more than the highest order of mental and moral culture. By Vedanta one can remove all the vanities and selfish desires from within himself and make himself free and perfect—a real man.

When Vedanta denies the world, or anything that comes before it, it does not mean to deny the existence of the world altogether, but says that the world is changeable, not permanent, and therefore phenomenal and not real, not eternal, not ever existing. The true nature of man intuitively wants to realize that place and happiness which will last forever. This place and happiness is called... Sat-Chit-Ananda.

—from *Swami Trigunatita: His Life and Work*

Let Us Be Simple

HENRY DAVID THOREAU

The author of Walden, the transcendentalist Thoreau passed away on 6 May, 138 years ago. Here is a selection from one of his letters. Thoreau influenced Gandhiji. Hope he will inspire us also!

The outward is only the outside of that which is within. Men are not concealed under habits, but are revealed by them; they are their true clothes. Circumstances are not rigid and unyielding, but our habits are rigid.

I do believe in simplicity. It is astonishing as well as sad, how many trivial affairs even the wisest man thinks he must attend to in a day; how singular an affair he thinks he must omit. So simplify the problem of life, distinguish the necessary and the real. Probe the earth to see where your main roots run. I would stand upon facts.

Men cannot conceive of a state of things so fair that it cannot be realized. Can any man honestly consult his experience and say that it is so? Did you ever hear of a man who had striven all his life faithfully and singly toward an object and in no measure obtained it? If a man constantly aspires, is he not elevated? Did ever a man try heroism, magnanimity, truth, sincerity, and find that there was no advantage in them? That it was a vain endeavour? Of course we do not expect that our paradise will be a garden. We know not what we ask. To look at literature—how many fine thoughts has every man had! How few fine thoughts are expressed!

What can be expressed in words can be expressed in life.

My actual life is a fact, in view of which I have no occasion to congratulate myself; but for my faith and aspiration I have respect. It is from these that I speak. Every man's position is in fact too simple to be described. I have sworn no oath, I have no designs on society, or Nature, or God. I am simply what I am, or

I begin to be that. I *live* in the *present*. I only remember the past, and anticipate the future. I love to live. I love reform better than its modes. There is no history of how bad became better. I believe something, and there is nothing else but that. I know that I am. I know that another is who knows more than I, who takes interest in me, whose creature, and yet whose kindred, in one sense, am I. I know that the enterprise is worthy. I know that things work well. I have heard no bad news.

As for positions, combinations, and details, what are they? In clear weather, when we look into the heavens, what do we see but the sky and the sun?

If you would convince a man that he does wrong, do right. But do not care to convince him. Men will believe what they see. Let them see.

Pursue, keep up with, circle round and round your life, as a dog does his master's chaise. Do what you love. Know your own bone: gnaw at it, bury it, unearth it, and gnaw it still. Do not be too moral. You may cheat yourself out of much life so. Aim above morality. Be not simply good; be good for something. All fables, indeed, have their morals; but the innocent enjoy the story. Let nothing come between you and the light. Respect men as brothers only. When you travel to the Celestial City, carry no letter of introduction. When you knock, ask to see God—none of the servants. In what concerns you much, do not think that you have companions: know that you are alone in the world. □

Is Buddhism Really Nontheistic?

PROF B. ALAN WALLACE

Buddha Purnima will be celebrated on the 18th of this month. Is Buddhism nontheistic? Prof Wallace discusses this topic here, comparing Buddhistic theism with Vedantic theism. He teaches at the University of California, Santa Barbara, USA.

Buddhism is commonly distinguished on doctrinal grounds from monotheistic and polytheistic religions by the fact that it refutes the existence of a divine Creator, and indeed there is ample textual evidence in early Buddhist, Mahāyāna, and Vajrayāna treatises to support this claim.¹ However, a careful analysis of Vajrayāna Buddhist cosmogony, specifically as presented in the Atiyoga tradition of Indo-Tibetan Buddhism, which presents itself as the culmination of all Buddhist teachings, reveals a theory of a transcendent ground of being and a process of creation that bear remarkable similarities with views presented in Vedānta and Neoplatonic Western Christian theories of creation. In the following paper I shall present this Vajrayāna Buddhist theory in terms of its images of space and light in the creation of the universe, and I shall conclude with a reappraisal of the nontheistic status of Buddhism as a whole.

Sūtrayāna Buddhist Antecedents

In the early Buddhist *sūttas*, the Pali term commonly translated as 'world' (*loka*) refers not to some purely objective universe that exists independently of experience, but to the world experienced by sentient beings. The

world that we as human beings experience, however, is not the only world, for there are other worlds in addition to our own;² but all worlds are said to be 'unreal' and insubstantial like a bubble and a mirage.³ As for the origination of the six modes of consciousness by which human beings experience our world, the Buddha likened such origination to the production of fire by rubbing a firestick. As Peter Harvey points out, this Buddhist theory, like that of the Upaniṣads, takes for granted the existence of a latent fire element that is present in fuel, which becomes manifest when the fuel is set aflame.⁴ This would imply that specific forms of consciousness likewise emerge from a latent mode of consciousness when the appropriate conditions are met, and that underlying consciousness is denoted in Pali with the term *bhavaṅga*, which can be translated as 'the ground of becoming'.⁵

In early Buddhist literature this ground-state of consciousness is said to be primordially pure and radiant, regardless of whether it is obscured by adventitious defilements,⁶ and it is from this state that all active mental processes (*javana*), arise, including volition and, therefore, *karma*. Thus, since the mani-

1. For a refutation of a Creator by the Buddha as recorded in the Pali canon see the 'Pāṭika Sūta', 2.14-17 in the *Dīgha Nikāya*; Śāntideva presents a classic Mahāyāna refutation of a Creator in his *Bodhicaryāvatāra*, IX.118-125; and a similar refutation in Vajrayāna literature is found in the *Kālacakratantra* and its principal commentary, the *Vimalaprabhā*, II.168-70.

2. Cf. *Majjhima Nikāya*, I.402.

3. Cf. *Sūta Nipāta*, 9; *Dhammapada*, 170.

4. Peter Harvey, *The Selfless Mind: Personality, Consciousness and Nirvana in Early Buddhism* (Surrey: Curzon Press, 1995), pp. 155-7.

5. Peter Harvey, op. cit., p. 160.

6. Cf. *Milindapañha*; *Anguttara Nikāya*, A.I.9-10 and 61

fold worlds experienced by sentient beings are asserted in Buddhism to be produced by the *karma* of sentient beings, it follows that the *bhavaṅga* must be the ground from which arise all *karma*, all the worlds formed by *karma*, and all states of consciousness by which these worlds are known. Moreover, the nature of this ground of becoming is said to be loving kindness, and it is the source of sentient beings' incentive to meditatively develop their minds in the pursuit of *nirvāṇa*.⁷ When final liberation is achieved, one comes to experientially realize the nature of the *bhavaṅga*, which then retains its integrity and is no longer prone to obscuration by defilements.⁸

While the Theravāda tradition largely marginalized the *bhavaṅga* both in theory and in practice, Mahāyāna Buddhism attributed central importance to the *tathāgatagarbha*, which bears a close resemblance to the *bhavaṅga*. The *Laṅkāvatāra Sūtra* says of the *tathāgatagarbha* that it is the naturally radiant and primordially pure awareness within each sentient being, which is obscured by such adventitious defilements as attachment, aggression, delusion, and compulsive ideation. It adds that this radiant awareness is the ground from which both good and evil arise, and it produces all forms of existence, like an actor taking on a variety of appearances. The *Śrīmāla-devī Sīṃhanāda Sūtra* asserts that it is that which inspires sentient beings to seek *nirvāṇa*,⁹ and the *Ratnagotra-vibhāga* (vv.51,84) makes the further claim that this awareness, which is naturally present since beginningless time, is implicitly replete with all the qualities of Buddhahood. But in order for those innate qualities to become manifest, the *tathāgatagarbha*, or *buddha*-nature, must be separated from defilements, much as gold ore must be refined to reveal its intrinsic purity. Thus, even in

these pre-Vajrayāna writings, there were clear and elaborated theories concerning a beginningless ground-state of awareness, which was the source of all other states of consciousness, the phenomenal world, and all sentient beings within it.

Vajrayāna Cosmogony

As the early Buddhist theory of the *bhavaṅga* was developed into the Mahāyāna theory of the *tathāgatagarbha*, the realization of which now took on paramount importance in meditative practice, the precise manner in which the *buddha*-nature gives rise to the phenomenal world was further developed in the Vajrayāna tradition. My primary source for the following account of Vajrayāna cosmogony is *The Vajra Heart Tantra*,¹⁰ a 'mind-treasure' (*dgongs gter*) of Dūdjom Lingpa (1835-1904), a nineteenth-century Atiyoga master of the Nyingma order of Tibetan Buddhism. Although this treatise is of quite recent origin, its well developed theory of cosmogony is an accurate representation of the general Atiyoga view, which is largely compatible with Vajrayāna theory as a whole. According to Dūdjom Lingpa, the source of the teachings in *The Vajra Heart Tantra* is the primordial Buddha Samantabhadra, who, like the *tathāgatagarbha*, is of the nature of beginningless, naturally pure, radiant awareness, replete with all the qualities of Buddhahood.

While the most common metaphor for the *bhavaṅga* and the *tathāgatagarbha* is that of radiant light, *The Vajra Heart Tantra* adds to this the central metaphor of space. According to this cosmogony, the essential nature of the whole of *saṃsāra* and *nirvāṇa* is the absolute space (*dhātu*) of the *tathāgatagarbha*, but this space is not to be confused with a mere absence of matter. Rather, this absolute space is imbued with all the infinite knowledge, com-

7. *Aṅguttara Nikāya*, A.I.10-11.

8. Peter Harvey, op. cit., p. 174.

9. D.M. Paul, *The Buddhist Feminine Ideal — Queen Śrīmāla and the Tathāgata-garbha* (Montana: Scholar's Press, 1980), ch. 13.

10. Cf. *The Vajra Heart Tantra: A Tantra Naturally Arisen from the Nature of Existence from the Matrix of Primordial Awareness of Pure Perception*. Collected Works of H.H. Dudjom Rinpoche.

passion, power, and enlightened activities of the Buddha. Moreover, this luminous space is that which causes the phenomenal world to appear, and it is none other than the nature of one's own mind, which by nature is clear light. Samantabhadra distinguishes five types of primordial wisdom implicit within the natural *buddha* of awareness:

Its essential nature is primordial, great emptiness, the absolute space of the whole of *saṃsāra* and *nirvāṇa*, the primordial wisdom of the absolute space of reality (*dharmadhātu*). Mirror-like primordial wisdom is of a limpid, clear nature free of contamination, which allows for the unceasing appearances of all manner of objects. The primordial wisdom of equality is so called, for it equally pervades the nonobjective emptiness of the whole of *saṃsāra* and *nirvāṇa*. The primordial wisdom of discernment is so called, for it is an unceasing avenue of illumination of the qualities of primordial wisdom. The primordial wisdom of accomplishment is so called, for all pure, free, simultaneously perfected deeds and activities are accomplished naturally, of their own accord. When the natural glow of awareness that is present as the ground—the *dharmakāya* in which the five primordial wisdoms are simultaneously perfected—dissolves into its inner luminosity, it is classified as *unobscured primordial wisdom*.¹¹

If the essential nature of each sentient being and the universe as a whole is that of infinite, luminous space, endowed with all the qualities of perfect enlightenment, why is this not realized? Samantabhadra explains that the reality of all phenomena arising as displays of the all-pervasive, ground-awareness is obscured by ignorance. Consequently, the *tathāgatagarbha*, which utterly transcends all words and concepts—including the very notions of existence and nonexistence, one and many, and subject and object—appears

to be a blank, unthinking void, which is known as the universal ground (*ālaya*). The experience of this void is comparable to becoming comatose or falling into contentless, dreamless sleep. From that state arises limpid, clear consciousness as the basis from which all phenomena appear; and that is the universal ground consciousness (*ālayavijñāna*). No objects are established apart from its own luminosity, and while it produces all types of appearances, it does not enter into any object. Just as reflections of the planets and stars appear in limpid, clear water, and the entire animate and inanimate world appears in limpid, clear space, so do all appearances emerge in the empty, clear, universal ground consciousness.

From that state arises the consciousness of the mere appearance of the self. The self, or *I*, is apprehended as being over here, so the objective world appears to be over there, thus establishing the appearance of immaterial space. To relate this evolution of the universe to the obscuration of the previously mentioned five types of primordial wisdom, it is said that ignorance initially obscures the inner glow of one's innate, primordial wisdom of the absolute space of reality, which causes an external transference of its radiance. As this evolutionary process continues, those five types of primordial wisdom transform into the five great elements (viz, the five primary colours) and the five derivative elements in the following way:

1. In the all-pervasive space of the *dharmakāya*, or *buddha*-mind, the inner glow of the primordial wisdom of accomplishment is obscured, and due to the activation of *kārmic* energies, the quintessence of the air element arises internally and transforms into radiant green light. Due to the power of delusion, this green light is reified and consequently arises externally as the derivative, or residual, air element.

2. With the obscuration by ignorance of the primordial wisdom of the absolute space of reality, its radiance appears as the great

11. All translations from the Tibetan are my own.

element of deep blue light. As a consequence of reifying this blue light, the derivative element of space appears.

3. With the obscuration of mirror-like primordial wisdom, its radiance appears as the great element of white light, which, when reified, appears as the derivative element of water.

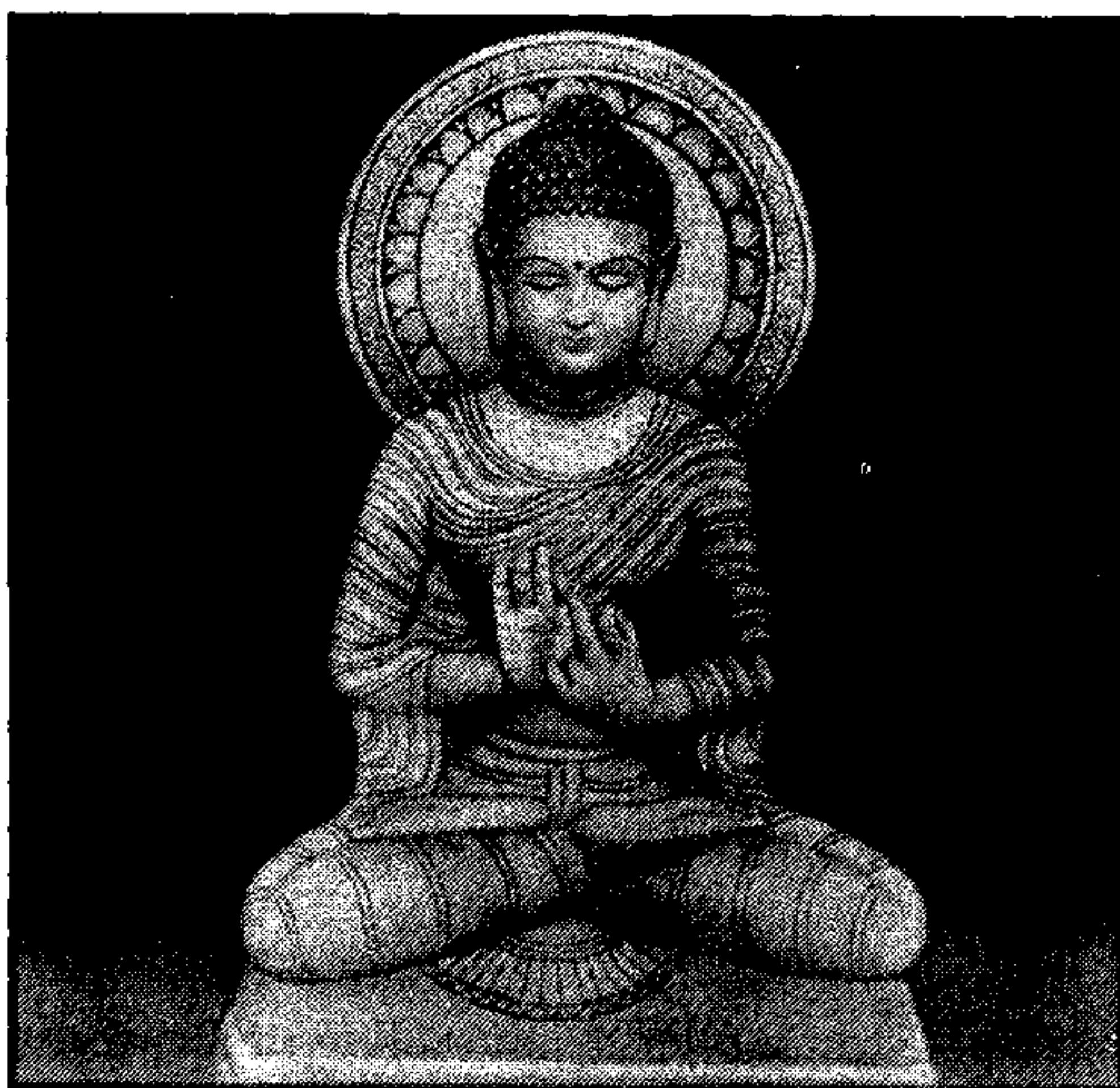
4. With the obscuration of the primordial wisdom of equality, its radiance appears as the great element of yellow light, which, when reified, appears as the derivative element of earth.

5. Finally, with the obscuration of the primordial wisdom of discernment, its radiance appears as the great element of red light, which, when reified, appears as the derivative element of fire. In this way, all the elements of the physical world are regarded as symbolic expressions of the *tathāgata-garbha*, and all the five elements are said to be present in each one, just as all the five primordial wisdoms are present in each one.

The five types of primordial wisdom manifest not only as the five elements that make up the objective universe, but their essential natures also manifest as the five psycho-physical aggregates that constitute a human being in *samsāra*. Specifically, once the appearance of duality arises within the domain of the primordial wisdom of the absolute space of reality, that wisdom appears as the aggregate of form; when such dualistic appearances and reification occur in the domain of mirror-like primordial wisdom, it manifests as the aggregate of consciousness; when the primordial wisdom of equality is so obscured, it manifests

as the aggregate of feeling; when the primordial wisdom of discernment is veiled by reification, it appears as the aggregate of recognition; when the primordial wisdom of accomplishment is so obscured, it arises as the aggregate of compositional factors.

As a development of the thesis stated in the *Laṅkāvatāra Sūtra* that the *tathāgata-garbha* is the source of both good and evil, *The Vajra Heart Tantra* asserts that it is the ground not only of all the qualities of enlightenment, but of the primary mental afflictions of delusion, hatred, pride, attachment, and jealousy. Specifically, thoughts of delusion arise due to the obscuration of the primordial wisdom of the absolute nature of reality; thoughts of hatred arise from the obscuration of mirror-like pri-



mordial wisdom; thoughts of pride emerge from the obscuration of the primordial wisdom of equality; thoughts of attachment emerge from the obscuration of the primordial wisdom of discernment; and thoughts of jealousy arise from the obscuration of the primordial wisdom of accomplishment. An assertion that is crucial to the theory and prac-

tice of Vajrayāna as a whole is that all mental afflictions are in reality of the very same nature as the kinds of primordial wisdom from which they arise.

In summary, the five primary colors, the five derivative elements, the five aggregates, and the five mental afflictions all originate from the obscuration of the five primordial wisdoms. In terms of the general Buddhist theory of the three realms of existence—the sensory realm, the form realm, and the formless realm—it is said that birth in the formless

realm is due to reifying the universal ground; birth in the form realm is due to reifying the universal ground consciousness; and birth as a god of the desire realm is due to achieving attentional stability in the realm of the dualistic mind (*citta*). In this way, Samantabhadra, the primordial Buddha whose nature is identical with the *tathāgatagarbha* within each sentient being, is the ultimate ground of *samsāra* and *nirvāṇa*; and the entire universe consists of nothing other than displays of this infinite, radiant, empty awareness. Thus, in light of the theoretical progression from the *bhavaṅga* to the *tathāgatagarbha* to the primordial wisdom of the absolute space of reality, Buddhism is not so simply nontheistic as it may appear at first glance.

Parallels with Polytheistic and Monotheistic Cosmogonies

While the nontheism of Buddhism is often set in stark contrast to the polytheism of the Vedas, the tradition of Vedānta, meaning the 'culmination of the Vedas,' presents a cosmogony strikingly similar to the preceding Atiyoga account. According to Vedānta theory, the universe is created through a series of illusory manifestations of Brahman, who alone is ultimately real and is identical with the real identity (*ātman*) of every sentient being.¹² The nature of Brahman is pure consciousness, beyond all conceptual distinctions such as subject and object, and its differentiation into individual animate and inanimate beings is only by way of appearances. Drawing on an analogy that is shared with the Atiyoga tradition illustrating the relation between the *dharmakāya* and the minds of individual sentient beings, the Vedāntin philosopher Śaṅkara likens Brahman to space, which is single and continuous, while each individual (*jīva*) is likened to the space confined inside a pot. In this metaphor, the

'space' of Brahman can be apparently enclosed within the 'pot' of each individual without affecting the transcendent unity of Brahman. But such differentiation, he adds, is merely the result of our failure to discriminate the *ātman* from its adjuncts such as the body, senses, and so on. Each individual is a mere appearance or reflection of the transcendent Self, or *ātman*, like the reflection of the sun in rippling water. Although the unity of Brahman and the *ātman* has never been different from the universe, defects are perceived in the phenomenal world due to defilements in the minds of individuals. Thus, in order to see reality as it is, the mind, with all its afflictions, conceptual constructs, and tendencies of reification, must be transcended.

Despite the many significant differences between Buddhist and Christian doctrines, medieval Christianity was profoundly influenced by Neoplatonic ideas concerning creation, which are also profoundly similar to those of Vajrayāna Buddhism and Vedānta. According to the ninth-century Christian philosopher John Scotus Eriugena (815?-77?), prior to God's creative self-disclosure in the generation of the natural world, He subsisted as a primordial unity and fullness which, from the limited perspective of created intellects and language, can best be described as *nihil*, or nothingness.¹³ John characterizes this nothingness, not as an absence, but as a transcendent reality beyond negation and affirmation. It is, he writes:

the ineffable, incomprehensible, and inaccessible brilliance of the divine goodness, which is unknown to all intellects, whether human or angelic, because it is superessential and supernatural. I should think that this designation [*nihil*] is applied because, when it is thought through itself, it neither is nor was nor will be. For in no existing thing is it understood, since it is

12. *Encyclopedia of Indian Philosophies: Advaita Vedānta up to Śaṅkara and His Pupils*, ed. Karl Potter (New Delhi: Motilal Banarsidass, 1981), p. 81.

13. Donald F. Duclow, 'Divine Nothingness and Self-Creation in John Scotus Eriugena' in *The Journal of Religion*, Vol. 57, No. 2, p. 110.

beyond all things. ... When it is understood as incomprehensible on account of its excellence, it is not improperly called 'nothing.'¹⁴

As the divine nothingness, which is ontologically prior to the very categories of existence and nonexistence, manifests in the phenomenal world, God comes to recognize Himself as the essence of all things. In this way, the whole of creation can be called a theophany, or divine appearance, and nothing could exist apart from that divine nature, for it is the essence of all that is. Following the Biblical assertion that man is created in the image of God, John declares that the mind of man, like the divine nature, retains its simple unity, as something that cannot be known objectively, in relation to its manifold expressions.¹⁵ Just as God comes to know Himself fully only through His self-expression as the phenomenal world, the human mind is fully comprehended only through its outward manifestations, even though it always remains invisible inwardly. In that way, each human recapitulates within himself the entire dialectic of nothingness and self-creation. Hence John argues that man's inability to objectively know the nature of his own mind marks him as being an image of God, for just as the mind of God does not objectively see itself, so is human consciousness never perceived as an object of the intellect.

Conclusion

While Buddhism is deemed nontheistic, the Vedas are regarded as polytheistic, and the Bible is monotheistic, we have seen that the cosmogonies of Vajrayāna Buddhism, Vedānta, and Neoplatonic Christianity have so much in common that they could almost be regarded as varying interpretations of a single theory. Moreover, the commonality does not end there, for in the Near East, the writings of Plotinus (205-70) also influenced Islamic and Jewish theories of creation. This apparent unity could be attributed to mere coincidence, or to the historical propagation of a single, speculative, metaphysical theory throughout South Asia and the Near East. For example, the Upaniṣads may well have influenced the writings of early Mahāyāna thinkers in India, and they could also have made their way to the Near East, where they might have inspired the writings of Plotinus. On the other hand, Plotinus declared that his theories were based on his own experiential insights, and similar claims have been made by many Buddhist and Vedāntin contemplatives. If these cosmogonies are indeed based upon valid introspective knowledge, then there may be some plausibility to the claims of many contemplatives throughout the world that introspective inquiry can lead to knowledge, not only of the ultimate ground of being, but of the fundamental laws of nature as well.¹⁶ □

14. Donald F. Duclow, op. cit., p. 110.

15. *Kālacakra Tantra*, V.65: 'Apart from sentient beings there is no great Buddha.'

16. Cf. Dom Cuthbert Butler, *Western Mysticism: The Teaching of Augustine, Gregory and Bernard on Contemplation and the Contemplative Life* (London: Constable & Co, 1967), p. 419.

Why is there Sorrow in this World?

If the world were one of unbroken happiness, if there were no disease, bereavement, sorrow, want, dangers or calamities, fear or anxiety, who would have felt prompted to call on God? The Lord has given these for our instruction, for testing us, so that men may not remain forgetful of Him and may take refuge in Him, realizing their utter helplessness.

—Swami Virajananda

Conquering Old Age with Melatonin

DR APARNA SUR

Dr Sur does research at the zoology department of Calcutta University. In this beautiful article, she presents a number of facts, gathered from a deep study of numerous books and journals, to assure us that diseases related to old age can be conquered using melatonin.

Melatonin or N-acetyl-5-methoxytryptamine is a hormone secreted by the pineal gland, which is a tiny structure lying in the groove between the cerebellum and cerebral hemispheres of the vertebrate brain. This hormone is an indole, synthesized by the pinealocytes of the gland from tryptophan. Tryptophan is first converted to 5-hydroxytryptophan and then into 5-hydroxy-tryptamine or serotonin. This serotonin is then acetylated by an acetylating enzyme into N-acetylserotonin. N-acetylserotonin is converted into melatonin in the presence of S-adenosylmethionine and enzyme HIOMT (hydroxyindole-o-methyltransferase). This HIOMT is found only in the pineal gland and its activity rises during night or the period of darkness, and falls by daytime or when there is light.

Melatonin plays a vital role in many actions of the body. It influences the development and functional activity of the gonads, the pituitary, the thyroid and other organs. Carefully controlled studies on different animals and humans have implicated the pineal gland and melatonin hormone in a variety of physiological functions, ranging from hibernation to hypertension, sleep to stress. Melatonin also has some beneficial role in various biological rhythm disorders like delayed-sleep phase syndrome (DSPS), jet lag, shift-work disorder etc. Recently, melatonin's role as an endogenous antioxidant found in the human body has created immense interest in it in scientific circles. The reason for this interest is, it is becoming impossible to negate its role in conquering old age. Free radical oxidants (compounds with unpaired electrons) are being formed in our body in great

amounts every moment; their only work is to destroy the healthy cells and tissues of the body. The work of antioxidants is to stop this destruction and protect them. The question may arise as to what these free radicals are and in what way they bring about destruction.

The Destructive Free Radicals

We all know that oxygen is imperative for us to survive. The oxygen which we inhale reaches all the cells of the body with the circulation of blood; in the cells is found mitochondria which process this oxygen to create energy. Almost 95-99% of the oxygen that we inhale is used to form energy. However, about 1-5% of it undergoes transformation and push healthy cells towards the jaws of death. This oxygen creates superoxide radicals (O_2^-) and hydrogen peroxide (H_2O_2). The superoxide radicals react with hydrogen peroxide to form the hydroxyl radical ($\cdot OH$). One or more unpaired electrons are present in all these atoms. These are the harmful free radicals. The moment free radicals are formed, they start destroying the components of healthy cells like proteins, lipids, and DNA. The hydroxyl radicals attract the hydrogen atoms from the fatty acids of the body and form peroxy radicals. These free radicals cause immense harm to the cells of the body. This is the reason for ageing and also many incurable diseases of the human body. Of such diseases some are coronary heart disease, diabetes, nervous disorders, Parkinson's disease, Alzheimer's disease, etc. According to the famous scientist Harman (1956), the chief cause of ageing is the destruction of proteins, lipids and DNA in the

body (which in medical parlance is termed as oxidative stress). It has been observed that with the passing of years, there is an increase in the amounts of hydrogen peroxide and superoxide anion (O_2^-) in the body.

The Action of Melatonin

Several researches have proved that melatonin obstructs the growth of these free radicals or reacts with them to convert them into ineffective and harmless chemicals. For instance, melatonin donates one electron to the formed hydroxyl radical ($\cdot OH$) and itself gets transformed into indolyl cation radical; this in turn will absorb or scavenge the superoxide radical. Hydroxyl radical, on the other hand, becomes harmless because of its gaining an electron. Apart from this function, melatonin also activates antioxidant enzymes such as glucose-6-phosphate dehydrogenase and glutathione peroxidase. The last mentioned enzyme is found in the red blood corpuscles and it protects haemoglobin from destruction. Experimenting on rats, scientists have discovered that melatonin obstructs the action of nitric oxide synthetase (NOS) enzyme which is found in their cerebellum. As a result of this, the formation of the harmful peroxy nitrate and hydroxyl radical is controlled.

Thus, we can say that melatonin is the old age-obstructing hormone in our body. Not only that, melatonin also protects us from several diseases associated with ageing. A scientist by name Maestroni and his assistants discovered (1988) that if melatonin is mixed with water ($10\mu g/ml$) and fed to rats, their survival rate increases by 20%. As melatonin has no ill-effects and is easily available, senior citizens can take it regularly and protect themselves from many age-related diseases. Melatonin is available commercially in India as Meloset (melatonin 3 mg) and Eternex (melatonin 3 mg + vit B₆ 10mg)

After its secretion in the pineal gland, melatonin goes straight to the blood; it is not stored anywhere. Researches have shown that darkness enhances the activity of HIOMT or acetylserotonin-o-methyltransferase enzyme of the synthetic pathway, and mela-

tonin secretion increases by night or during dark periods. It has been found that melatonin concentration in the pineal glands of chicken, rat, and quail is high in darkness. Human blood also contains high amounts of melatonin at night. The melatonin level in blood plasma increases from 9 or 11 at night, is the highest between 2 and 4 in the early morning, and lessens slowly thereafter. It is lowest in the late afternoons. According to scientists, the highest amount of melatonin is secreted in childhood, reduces with age, and is very less in old age. As a result of this, aged people suffer from insomnia. According to Wurtman, if 0.1-0.2 mg melatonin capsules are given to insomnia patients daily, they will sleep well. It has also been reported that if serotonin is administered to rabbits, drowsiness is induced initially, followed by arousal pattern and relaxation. As I said earlier, because there is the reduction of melatonin level in blood in old age, oxidative stress begins to destroy the cells of the body. Parkinson's disease is a result of this destruction. This disease hardens the muscles and there are uncontrolled tremors in the body. Scientists have tested animals by giving them MPTP (1-methyl 1-4 phenyl 1,2,5,6 tetra hydro pyridine) injections: Parkinson's was observed in them. But along with MPTP injection if melatonin is also taken regularly, signs of Parkinson's disease are reduced.

Melatonin is not only an old-age resistant hormone but it also controls the behaviour, mental states and personality of a person. It is also known to be an antidepressant. Recent researches have shown that melatonin obstructs the growth of tumours. Scientists have experimented and found that the practise of yoga and meditation will increase the melatonin level in the body. This is because, during the practise of yoga as well as meditation, melatonin is secreted in great amounts. According to scientists, meditation and melatonin are two factors which unitedly protect us from many ailments like mental stress, hypertension, palpitation, etc. □



The Chosen One

He was a poor boy; a shepherd by profession. The boy was happy with his job. Amidst sylvan surroundings he roamed about with his sheep. He did not like to study. What after all would he do with studies? His sheep were all that he wanted. However, his contentment was challenged by Providence one day. He was digging earth, and all off a sudden he noticed a big vessel. Inside it were hundreds of gold coins. Gold coins for a poor boy! That changed his life. He grew wealthy, and in time became a chieftain, ruling over several villages. He was brave. He would fight smaller enemies and capture their lands. He became known to the king. All went well till he began to have a strange dream. The first time he ignored it.

He saw the dream for a second time. It was a peculiar dream. The Lord came in his dream and said in a sweet voice, 'My dear, will you not be my minstrel?' The chieftain was perplexed. 'Why me? I am rich and happy. I am ruling over many villages now and shall wage wars and conquer many more soon. I am dear to the king. If at all, my desire is to become as close to the king as possible. And you wish that I should be your minstrel, your servant? Should I go begging along the streets?' When the dream ended, the chieftain was thoroughly upset. It was unbelievable! Was it God Himself coming to him and requesting him to be His minstrel? Or was it something else? A ghost? During the course of the day, however, the chieftain forgot all about his dream. Again that night he saw the dream for the third time: 'O my dear child! Will you not give up everything and become my minstrel?' The same sweet, compelling voice. The chief was moved, but got angry also. 'Why are you after me? I was born a poor man in a low-caste family, all right. But I am

rich today because of my good fortune. Do you want to make me a beggar once again? Nonsense! There are thousands of beggars. Go to them! Why bother me?' The Lord smiled. The chieftain was irritated and tired too. He could not understand what was happening at all! To him it all seemed to be an ill omen. He was secretly planning to attack the neighbouring chieftain. He was about to declare his supremacy. At such a crucial juncture came such disturbing dreams. The best thing, the chief thought, was to forget the dream episode altogether and fight. Dreams are after all dreams.



Bugles sounded, swords clashed, arrows flew on all sides, and there was war. Many died and many were wounded. Unfortunately for our chieftain, his enemy proved stronger and his army was easily overpowered. An arrow pierced the shoulder of the chieftain and he fell down in a pool of blood. Enemies thought that he was dead. They triumphantly walked away. They had won!

It was dark. There was stillness all over. The poor chieftain moaned in pain and shame. And then he heard, 'Will you not become my minstrel, my child?' Someone whispered in his ears. The same sweet and melodious voice! The chief turned and saw! Oh, it was all hazy! Was it the dream again? Was he in delirium? 'O God! Why me? Why are you after me? You see, I am broken now. But if you really wanted me, why did you forsake me in war?' 'I love you dearly, my child. I want you to sing my glory everywhere.' The same request. The fallen chief was irked. 'You don't seem to care for my wounds and pain. You don't seem to bother about my difficulties. All you want is that your selfish interest must be fulfilled.' 'Where are your wounds? Just see,

they are all gone,' said the Lord. Instantly all wounds on the chieftain's body were healed.

The chieftain was no doubt happy, but he said, 'My Lord, you are bent upon making me your minstrel. I don't understand why you are after me. Anyway, I agree. But remember, you have made a terrible mistake. I am an unlettered person. I was a chieftain till now out of sheer luck. I don't know your books, scriptures, etc. I am a fool. I was only a shepherd. You are running after me thinking that I am a big man!'

The Lord smiled sweetly. The chief understood that the Lord knew it all. 'So you knew! I tell you again, I am not spiritually initiated; I don't know any mantra. How can I be a minstrel?' 'You will be initiated soon,' replied the Lord. The chief said, 'I have a condition. I shall be your minstrel, but you should reveal yourself to me whenever I want.' 'Granted,' said the Lord. 'In that case, show me your real form now, on this battlefield,' challenged the chief. In a moment his desire was fulfilled. Eyes beclouded, tears rolled down in torrents, and the former chief saw the Lord in all his glory. At last the Lord had succeeded. The chief with the sword was gone; the minstrel with the tambura was born.



Everyone was astonished when the minstrel stood in front of the temple and sang the next day. 'Yes, my old self is gone. I am a minstrel now. I am God's servant.' Songs came out spontaneously. He walked and walked; he went where his feet took him. His song pleased many and some fed him. There were troublemakers too. But the minstrel cared little. His first desire was to be initiated into spiritual life. How could he serve the Lord, he thought, when he didn't know any mantra at all! He reached the monastery of the local spiritual teacher. 'I want to be initiated,' he said humbly. Though otherwise compassionate, the teacher appeared harsh towards him. He enquired, 'Who are you?' 'I am a lowborn. I was a poor shepherd and used to tend sheep; but one day I suddenly became

rich. Now everything is gone.' 'You tended sheep, did you say? All right then. You repeat the word "buffalo". That's your mantra.'

Though this was a joke, the minstrel took it seriously. He began repeating the mantra 'buffalo'. After days of sincere repetition, a massive buffalo stood before him. The teacher saw the gigantic creature and was slightly scared. He told the minstrel, 'You have succeeded in realizing the buffalo. That's good. Order the buffalo to remove the huge rocks on the yonder mountain.' That was done instantly. The test was over. Everyone now believed that the minstrel was out of the ordinary. The teacher blessed him.

One day, having covered much distance, the minstrel came to a great temple. It was the temple of Lord Krishna. The minstrel wanted to enter the temple but was stopped. Entry into the temple was only for the upper castes. The minstrel pleaded in vain. The temple authorities were about to drive him away from that area. Finding no other way, the minstrel went rearwards, stood behind the temple and started singing heart-rending songs. It was so painful not to be allowed to see Krishna. He cried in anguish. And the Lord heard his dear one. Suddenly, a few bricks in the rear wall fell; there was a circular hole in the wall just behind the image. Not only that, Krishna had turned his face! Through the small hole that had been created, the minstrel saw the smiling Lord Krishna to his heart's content. A miracle had occurred!

In the Krishna temple in Udupi, Karnataka, even today you will have to walk over to the back of the temple to see the face of the Lord. Though the body of Krishna faces the temple door, his face faces the rear. The temple is a massive complex but it is practically of no use, as worship to Krishna is performed from behind the temple. A small platform has been constructed for the purpose. Kanakadas, the minstrel-saint of the 17th century, has become immortal owing to his devotion to Krishna. His songs are sung with devotion even now. And we must remember that he was the chosen one! □

Book Review

GANEŚA—UNRAVELLING AN ENIGMA:
By Yuvraj Krishan. Published by Motilal Banarsidass, 41-11A Bungalow Road, New Delhi 110007. 1999. Pp. xxi+235. Rs.695.

Ganeśa—Unravelling an Enigma is an aptly named book. The author, Yuvraj Krishan, has made a remarkable presentation of one of the most popular gods of the Hindu pantheon. Indian mythology, stretching over vast periods of time, is so expansive and varied, and its accounts so conflicting and confusing at times, that it needs a lot of patient study and dedication to put things in a clear perspective. The book performs the task admirably well and, more importantly, impartially.

The stages in Ganeśa's development from an insignificant folk deity (*grāma-devatā*) noted for being a malevolent spirit, through the creator of obstacles (*vighnakartā*), to the remover of obstacles (*vighnahartā*), as also a presiding deity of intelligence, the granter of success, the presiding deity of music etc, is a unique feature of Hinduism and the Indian psyche. Swami Vivekananda has pointed out that Hinduism has all along showed its resilience and growth by absorbing or assimilating into itself lesser, and sometimes alien, deities and ideas, and making them its own in its singular way. He says further that as individuals evolve, correspondingly they develop higher and higher ideas regarding the deity they worship. The book will be better understood with these facts in mind.

The Hindu religion and its tradition were largely the creation of Sri Sankaracharya. It is he who is also credited to have introduced the *pañcāyatana pūjā*, worship of five deities—Śiva, Viṣṇu, Devī, Sūrya, and Ganeśa. Thus, being firmly established in the Hindu pantheon, Ganeśa is, for all times to come, assured of worship. In India it is the sages and saints that perceive through their spiritual insight certain deities, religious symbols, scriptures, rituals, etc, that will be beneficial in fulfilling not only the spiritual needs of the people but also their psychological necessities. Through the force of their spirituality, they establish traditions around the deities, which continue.

This book is based on a collection of some articles on Ganeśa that the author had written in several prestigious journals, both in India and abroad. The first thing that strikes the reader is that a very exhaustive literature, both ancient and mod-

ern, has been carefully sifted in order to prepare this book. Though such books, relying on historical facts and conflicting mythological passages, tend to be dry, the author has amply compensated it with his thoroughness and devotion to the subject matter.

Lord Ganeśa is an interesting god, having an unconventional physiognomy and a special sort of vehicle. Even more interesting is that he is not only worshipped irrespective of caste in Hinduism but finds a special place in Buddhism and Jainism also. Again, all major sects in Hinduism have tried to appropriate him into their fold, even going so far as inventing suitable mythology. A medieval sect called Gāṇapatyas were exclusively the worshippers of Ganeśa. There are a few Upanishads also in Ganeśa's name, considered spurious by some. In Bengal, during the worship of the goddess Durgā, Ganeśa is also worshipped as one of the four major subsidiary deities. Maharashtra has of course a wonderful tradition of Ganeśa worship. Thus, though the whole of India and many countries in the world worship this god, there is no quarrel at all over him.

Ganeśa—Unravelling an Enigma brings out the glory of Lord Ganeśa with force. The 17 chapters that the book contains look at this god from different standpoints, in a scholarly way. Of the areas of study undertaken in this work, Ganeśa's place in Indian life, his history, Vedic, Puranic and other interpretations, Ganeśa in other religions and beyond Indian shores, are some. There are one or two places where typographical errors were noticed and also repetitions. Such repetitions cannot be done away with in such an exhaustive work. There are educative Appendixes: in the second, the author refutes what some ridiculous modern writers try to put forward as Oedipal conflict—the fight between Śiva and Ganeśa.

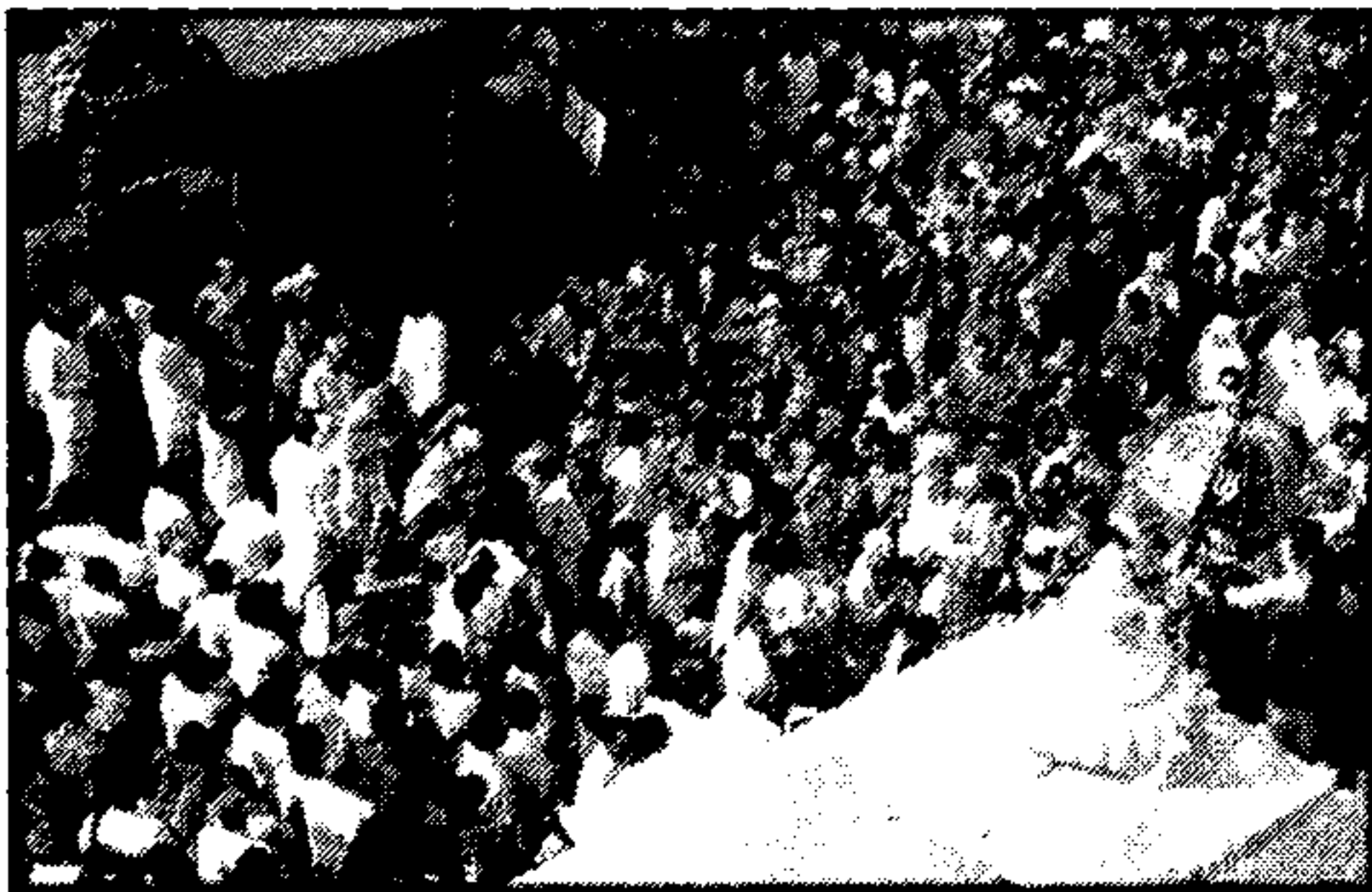
Over 40 pages of wonderful illustrations on art paper are a visual treat: Ganeśa iconography is depicted in all its splendour and glory in these pages; it is all very informative. References and footnotes are given towards the end of each chapter. There is also a Select Bibliography, an Author and Title Index, and a Subject Index.

No expense seems to have been spared by the publisher in bringing out this double demy book in excellent print with large type. It should be made available not only to Ganeśa's devotees but also to all those interested in Indology.

Swami Satyamayananda
Advaita Ashrama, Calcutta

News and Reports

VIGNETTES OF THE KUMBHABHISHEKAM CEREMONY OF THE SRI RAMAKRISHNA TEMPLE, CHENNAI



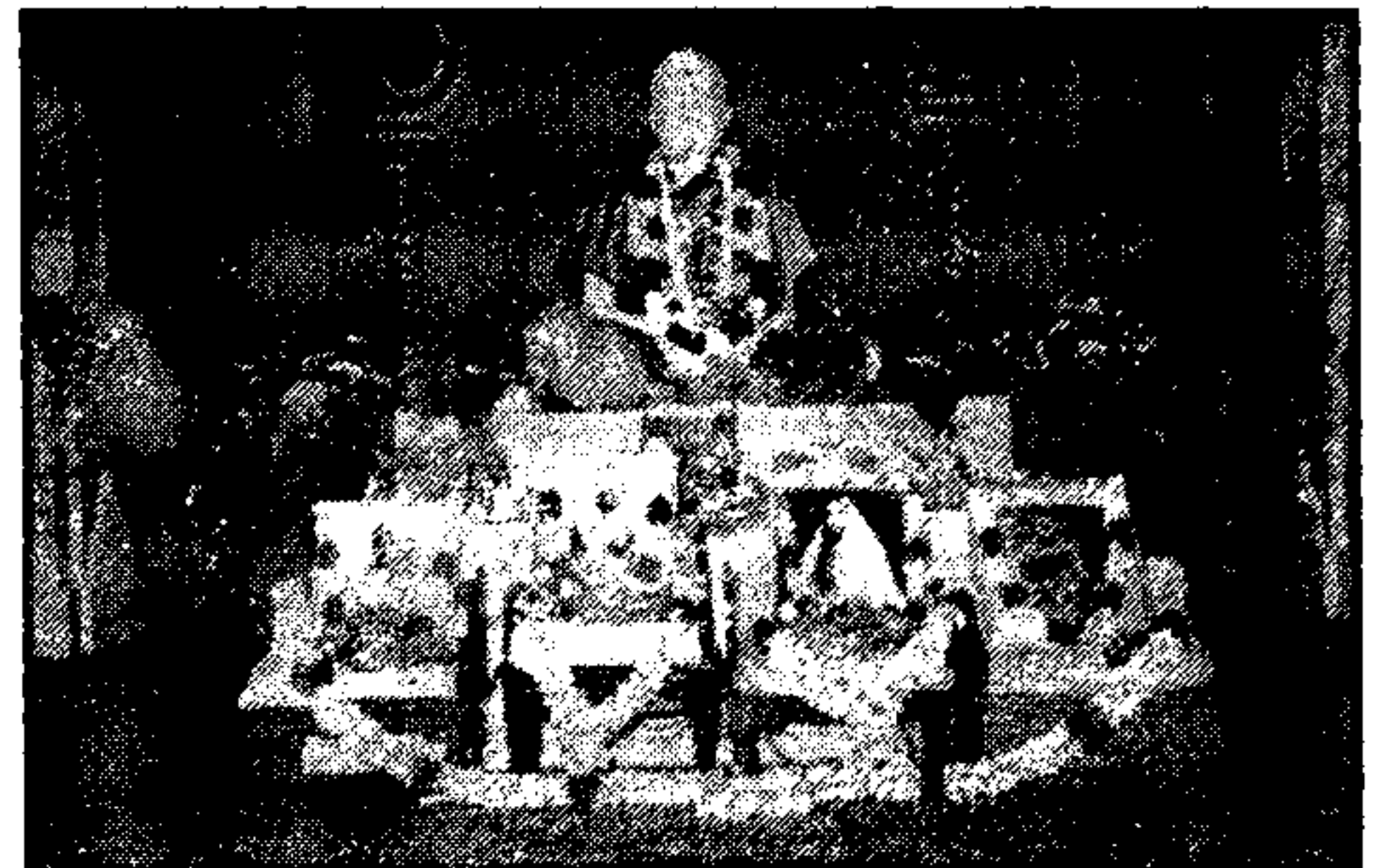
Starting for the ceremony...



...in procession



The first arati by Most Rev President Maharaj in...



...the new shrine



The Chandi homa and...



...the religious harmony convention